June 1945

Chemical Industries

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A System for EXPANSION RESEARCH p. 949

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THE CHEMICAL BUSINESS MAGAZINE

Chemical Industries

VOLUME 56
NUMBER 6

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Re: PLASTICIZERS— BY HARDESTY

Much has been written about the unlimited possibilities of plastics and synthetic resins and the coming "Plastics Age," but it is not generally realized that unless they are used in combination with fairly large quantities of plasticizers, most plastics are of little value. The widely publicized vinyl copolymer resins, for example, are white powders resembling flour, and it is not until they are mixed with substantial proportions of plasticizers that they can be used for the production of cable coatings, sheets and films, Army raincoats, can linings, and countless other useful products. Some of the new synthetic rubbers are only suitable for many special applications when they are used in combination with plasticizers. The selection of the proper plasticizer is, therefore, of the utmost importance in determining the properties of the finished article made from plastics or synthetic rubber.

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THE READER WRITES

Water Aids Setting of Litharge and Glycerine

To the Editor of Chemical Industries:

On page 454 of the March issue you give some information covering pipe joints. May I add to this?

Litharge and glycerine sometimes sets rapidly, sometime slowly. Some years ago I read that this was due to the water content of the glycerine. It is apparently so. If the glycerine is anhydrous it takes many hours to set. If, however, a little water is incorporated in the glycerine, setting may be accomplished in five minutes or so. Up to 5 per cent of water may be used, the speed of setting being dependent on the water in the glycerine as well as the water added.

I believe this is not generally known.

C. S. TREACY, Chemical Engineer
315 Heathcote Rd.,
Scarsdale, N. Y.

Toxicity of Lactic Acid

To the Editor of Chemical Industries:

In the January 1945 issue of your magazine, p. 116, you published a brief condensation of an article appearing in the *Journal of the American Medical Association*, Vol. 125, No. 17, August 26, 1944, pp. 1179-1181, entitled "Lactic Acid—A Corrosive Poison." Similar condensations have appeared in other publications.

Review of these condensations and study of the original article led to the conclusion that important details and significant conclusions reached by the authors, Drs. E. Gordon Young and Ralph P. Smith, have not been accorded sufficient weight, and that these necessarily brief condensations may have led to erroneous impressions concerning the toxicity of lactic acid. With the object of clarifying any possible misunderstanding concerning this matter, we are outlining below certain salient facts obtained from our Medical Division, which we think may be of interest to you.

To begin with, it is an old and well-established fact that such organic acids as lactic, acetic, citric, and tartaric, are injurious to the human body if taken in concentrated form and large amounts. The same is true, of course, for numerous other food additives, including ordinary table salt.

On the other hand, however, it is equally well known that such acids are not injurious in the relatively low concentrations in which they are found in such food products as milk, fruit, or vegetables. Rather, they may be actually beneficial in such concentrations, and have long been employed in a variety of beverages and foods. U.S.P. lactic acid has been used in infant formulae for many years.

As evidence of the inherent non-toxicity of lactic acid in low concentrations, the authors of the article in the Journal of the American Medical Association significantly stated: "All ingredients (used in the infant formulae) had been used for the same purpose previously." This obviously implies that no earlier difficulty had been ecountered when lactic acid had been used in proper concentration.

The standard infant feeding formula cited in the original article would contain approximately 0.4% lactic acid by volume, which is much less than the lactic acid content of many naturally fermented food products, such as pickles, in which the lactic acid content is of the order of 0.6 to 1.2%; sauerkraut, about 1.5%; and buttermilk, likewise about 1.5%.

The actual formula used by Drs. Young and Smith in their toxicological study on rabbits contained approximately 34% lactic acid, which could only have occurred in the infant formula by erroneously introducing a much larger amount of the acid than is ever used in such formulae. The authors recognized this in making their tests, and also recognized that no one could be expected voluntarily to swallow such a high concentration of the acid. This was demonstrated by the fact that a normal 10-day-old infant violently rejected a formula containing a large excess of lactic acid.

Since lactic acid in the concentrations found in natural foods, or employed in properly formulated infant food, is not toxic, the primary lesson to be learned from the investigation of Drs. Young and Smith is that in the preparation of foods or infant formulae, due care should be exercised to insure that proper concentrations of the lactic acid are used.

In view of the well-established fact that lactic acid in proper concentrations is beneficial rather than injurious, we believe you will agree with us that it would be highly unfortunate if any section of the public should get the impression that lactic acid is inherently dangerous to use in beverages, formulae for the feeding of infants, or any other type of foodstuff.

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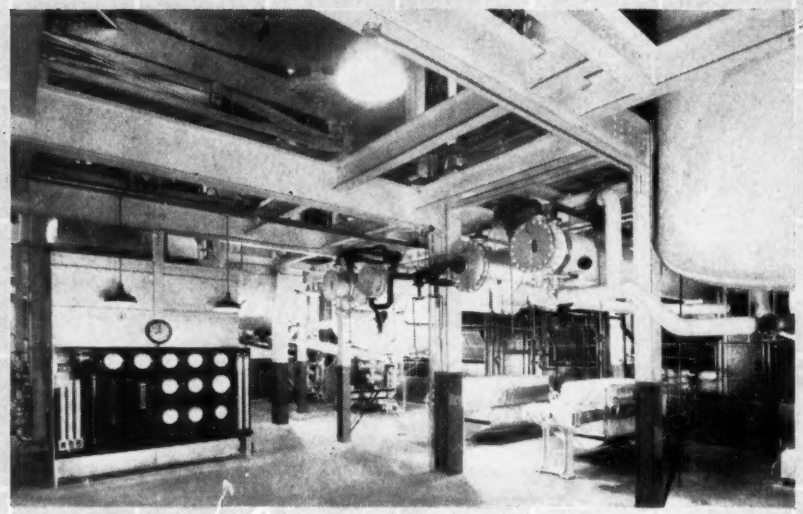

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CHEMICALS INDISPENSABLE TO INDUSTRY AND VICTORY

WASHINGTON

T. N. SANDIFER *reporting*

What Now for Chemicals? . . . Changeable Carbon Black . . . Manpower Easing Oil and Gas Inquiry . . . Synthetic Fuels Appropriation Cut

Transition Period

WAR PRODUCING INDUSTRIES face a slow transition period. This is expected to be particularly true of chemicals. They are one of the basic war materials which will continue in tight supply for many war uses and civilian needs despite V-E Day.

Officials here generally discount, however, the reports heard that part of the stringency results from anticipatory reconversion orders.

Meanwhile the first relaxation by War Production Board of general materials control affected only a relatively small number of chemical orders of minor importance.

In this connection, it is not now expected that chemical producers abroad will figure very strongly, if at all, in this country's war procurement plans. The armed forces need primarily finished products, and, secondly, there is hesitancy reported here in placing dependence on foreign industries.

Natural Gas Investigation

ANOTHER INVESTIGATION, this time by a Federal agency, appears likely to be superseded by Senate hearings scheduled to begin this month on the oil and gas industries.

A special Senate committee was originally established under the late Senator Maloney to investigate petroleum resources. This committee is now headed by Senator O'Mahoney, and the agenda drawn by him indicates that much of the investigation will deal with the natural gas industry. If this develops, it may do much of the work originally planned by the Federal Power Commission for its investigation. This inquiry is technically deferred until some time in the Fall, but may be indefinitely postponed.

Meanwhile representatives of the petroleum and natural gas industries have formed an industry group which will act as a steering committee in connection with the Senate hearings.

Postwar Taxation Plans

THE JOINT COMMITTEE ON INTERNAL REVENUE Taxation has recommended to the House Ways and Means Committee that current business tax policies be modified, with emphasis on an increased exemption from excess profits tax liability from the present $10,000 to $25,000, and making available for reconversion needs certain postwar tax credits and postwar refund bonds.

Manpower Outlook

AFTER JULY 1, says War Manpower Commission, there will be some relaxation of manpower controls on new and expanded civilian production. After that date, it is stated, Group I areas will be those in which there is a tight labor supply for war needs; all manpower controls will be maintained for such areas; Group II will be areas where overall, the labor supply is balanced; manpower controls will be optional; controls will lapse entirely in Group III and IV areas, which are those in which placement of war contracts will be encouraged to take up employment slack, and where civilian production will be encouraged.

No hearings have been scheduled as yet on the McDonough bill, H. R. 2827, to authorize release of technically-trained personnel, and deferment annually, of specified numbers of qualified technical workers from the draft.

Carbon Black Confusion

RELIABLE THOUGH UNOFFICIAL INFORMATION points to easing of the carbon black demand. Chemicals Bureau of War Production Board has been under fire for its supposed failure to provide for sufficient production and at this writing a Congressional investigation is still in progress. Witnesses before the committee ascribed the shortage in part to two causes: failure of the Chemicals Bureau to push a production program, and reluctance of the carbon black industry itself to expand because of a price situation.

Subsequently a witness from the Rubber Bureau of WPB told committee members that the Army intended reducing its heavy tire requirements, which would materially alter the demand on the carbon black supply. This statement appears to be borne out in other departments, without any official announcement having been made. It has had the effect of obviously slowing the investigation, and there were hints that the whole thing might die.

Synthetic Fuel Experiment

THE INTERIOR DEPARTMENT appropriation suffered a good many cuts, among which the allotment in the House bill for development of synthetic fuels suffered drastically. The Synthetic Liquid Fuels Act, as passed more than a year ago, authorized expenditures for the synthetic fuels program amounting to $30,000,000. The current bill as reported, called for $6,000,000, greatly disappointing Congressional backers of the program. Some $5,000,000 already had been appropriated, and with this the Bureau of Mines has established its synthetic fuel organization, initiated construction of experimental and test laboratories, tested coals and other materials, selected a site for the oil shale demonstration plant, and made plans for construction of other demonstration plants.

Construction of the larger scale demonstration plants for production of liquid fuels from coal, lignites, oil shales and other materials by the gas synthesis process and by hydrogenation involves altogether about $13,000,000, for purchase of sites, fabrication and erection of plants, and initial operation of the oil shale mine, besides certain related research and other work.

Meanwhile, it is disclosed, Government representatives have followed the Army into Europe, and are visiting as many of the noted synthetic fuel plants of Germany as can still be found. Admittedly the Allied bombing was very thorough.

However, this mission is stated to be studying what is found of the plants, collecting records, interviewing operating personnel, trying to ship back samples of the chemicals and formulae used by the Nazi engineers.

What they have learned indicates that American scientists have some improvements that may be superior to anything produced by the Germans, while admitting they expect to find some technical processes over there more advanced than our own in certain instances.

The consensus here is that what has been found has been very stimulating to our own synthetic fuels program. It has been learned, according to report, that Germany produced synthetic diesel oils superior to the diesel oils used by the American Navy. The Bureau of Mines intends to produce these superior oils in the gas synthesis plants it intends to build. The oils will be supplied to the Navy for research, and private industry will be given the necessary data for commercial production of these fuels, according to plan.

It is recalled that the German processes used "brown" coal, but if it is found that the better German processes are adapted to native materials, the results will be very important.

Hydrogenation studies will be carried on in the research and development plant at Bruceton, Pa., near Pittsburgh. The hydrogenation plant will produce about 200 barrels of gasoline a day. A refinery is included in the estimate, but it is stated that the gasoline leaves the vapor phase converters at almost 84 octane, and by treatment with tetraethyl lead and cumene or iso-octane, can be brought directly to 100 octane.

Stockpiles of Crude Materials at the War's End

THE END OF THE WAR WITH JAPAN may find the United States with large stocks of aluminum, antimony, asbestos, bauxite, cadmium, chromite, cobalt, cryolite, graphite, iodine, mercury, opium, quinine derivatives, rosin, shellac, tungsten and various ores and minerals, it is stated by the Foreign Economic Administration.

It is expected now, however, that most of the Government's stockpiles of these and other materials imported for war may either be absorbed in the strategic stockpiles required to be established under the Surplus Property Act, or if not so used, will be immediately needed by private business in most cases.

Lower Tariff Rates Asked

THE HOUSE SPECIAL COMMITTEE on Postwar Economic Policy has made a series of recommendations, all pointing to more liberal tariff rates and lowered trade restrictions. Among others, the Committee suggested an international convention to outlaw private price-fixing agreements internationally, division of foreign markets by the same means, import quotas, or production limitations.

All private agreements between international industry parties would be subject to close examination as to their purpose, and all such agreements would be subject to registration.

Lime Producers Aided by Price Boost

OFFICE OF PRICE ADMINISTRATION has taken cognizance of production difficulties of producers of chemical, building, and industrial lime in Virginia and Southeastern areas included in Districts 4, 10 and 11 of the National Lime Association, except Florida. Effective May 12, they were granted an increase of 65 cents per net ton, f. o. b. plant.

Many of the companies affected, it was said, are small concerns not highly mechanized, and the loss of a normally plentiful labor supply has caused many such companies to close, and production of others to decline, despite the demand for all the lime it is possible to produce.

Philippine Raw Materials

WHILE A CONSULAR AND TRADE MISSION is en route to the Philippines, there has now been introduced in the Senate a bill to provide for activities of the High Commissioner and his staff in the Islands. The argument for the appropriation is that this country badly needs some of the materials which are believed to be still available in the Philippines, such as copra and vegetable oils.

Reports here indicate, however, that the copra industry "is practically non-existent from an export standpoint."

Sanitary Engineering

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Among the many factors that have contributed to good health in America is the average community's insistence on a pure water supply and an efficient system of sewage disposal. Sanitary engineering is, in fact, a cornerstone on which better standards of health are being built in this country and American sanitary engineers are among the most progressive in the world. Their pioneering experience and their specialized knowledge gained through years of planning and construction will serve them in good stead in the post-war period when new and finer public works will be built. They will be working in that "Margin of Experience" enjoyed by all pioneers and from which springs many new developments and improvements.

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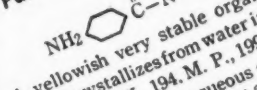

A yellowish very stable organic material which crystallizes from water in monoclinic prisms. M. W., 194. M. P., 199°C. Very soluble in water and aqueous solutions; least soluble in a pH range of 2.8-3.2; fairly insoluble in aromatic solvents. Hydrolyzed only with very strong hot caustic solutions. May be a valuable adjunct in the use of penicillin. Available in limited quantities.

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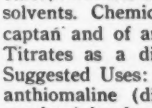

Nearly white, crystalline powder. M. W., 152.14. M. P., 139°C. Easily soluble in esters, alcohol and acetone; rather easily soluble in ether; insoluble in benzene and petroleum solvents. Chemical properties of a mercaptan and of an aliphatic dibasic acid. Titrates as a dibasic acid with alkali. Suggested Uses: In the manufacture of anthiomaline (di-lithium-S-antimonythiomalate) for the pharmaceutical trade. As a depilatory in the form of the calcium salt. Organic synthesis, especially in synthetic polymers and oil processing fields. As mild antioxidant. Available in sample quantities.

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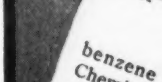

M. W., 220.27. White, waxy crystals. M. P. 115-116°C. Slightly soluble in water. Very soluble in alcohol, benzene and many organic solvents. Chemical properties of a dibasic acid; of a thioether; of an aliphatic hydrocarbon. Suggested Uses: Organic synthesis, especially in pharmaceutical and oil processing industries. Sample quantities available.

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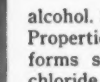
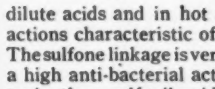


M. W., 167. M. P., 240-241°C. Light yellow crystals, insoluble in water, cold benzene, toluene, xylene, and alcohol. Soluble in hot alcohol. Chemical Properties: Those of an aromatic acid, forms soluble sodium salt, esters, acid chloride and amides. The nitro group is easily reduced to an amino group. Suggested Uses: Organic synthesis, intermediate for dyestuffs and pharmaceuticals. Available in sample quantities.

4-4' DIAMINODIPHENYLSULFONE



$C_{12}H_{12}O_2N_2S$. Almost colorless solid crystallizing from alcohol in plates. M. P., 176-7°C. (corr.) M. W., 248. Soluble in dilute acids and in hot alcohol. Gives reactions characteristic of aromatic amines. The sulfone linkage is very stable. Possesses a high anti-bacterial activity but is more toxic than sulfanilamide. Solubilized derivatives such as diasone and promin have shown promise in the treatment of tuberculosis. The diamine itself can be used as an intermediate for azo and other dyestuffs. Available in sample quantities.

These products are recent developments of the National Research Laboratories. Experimental quantities are available, if you believe they may have commercial value in your products or processes. Your inquiry will receive prompt attention.

NATIONAL ANILINE DIVISION

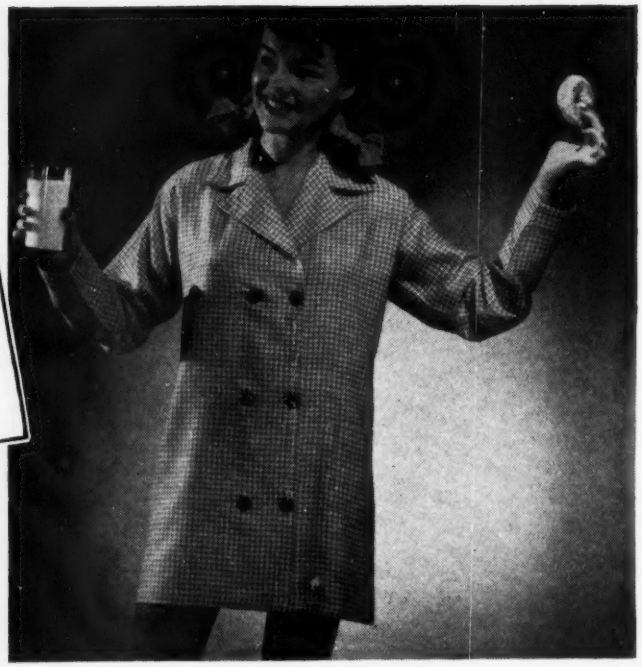
ALLIED CHEMICAL & DYE CORPORATION

40 RECTOR STREET NEW YORK 6, N. Y.

LIFE On The

WAR SHORTAGES ACCELERATE THE USE OF CASEIN IN NEW FIELDS OF MANUFACTURE

Best known for its extensive use in the production of coated papers, as well as for its use in certain types of adhesives, paints, and as a plastic material, casein in recent years has become increasingly important as a raw material for other purposes. Increasing amounts, for example, are being used in sizings for rayon tire cord... for producing a fiber with many of the qualities of natural wool. In many old and new cases for casein, Cyanamid supplies the well-known brands of ACCO* domestic caseins, and the famous Dairyco brand casein.



(*Above*) **THE FIRST SYNTHETIC PROTEIN FIBER** to meet the exacting requirements of American textile manufacturers is a material in which casein is a basic ingredient. The fiber has the same softness, resiliency, and thermal qualities of wool.

(*Left*) **IN THE PRODUCTION OF FINE COATED PAPERS** for magazine covers, writing and printing stock, labels and packaging, casein has always been utilized to improve printing qualities. Both Cyanamid's imported Dairyco brand and ACCO* brands of domestic caseins are widely used by the paper industry.

(*Above*) **MILLIONS OF POUNDS OF RAYON TIRE CORD** now being woven into tires for trucks, airplanes, jeeps, gun carriers, and other military machines, are treated with casein sizing. Cyanamid's Dairyco brand casein has been found most suitable for this use because of its exceptional uniformity and high adhesive strength.

Chemical Newsfront

(*Right*) **"FIREMAN'S RED"** identifies everything connected with fire fighting, from engines to alarm boxes. Similar use of specific colors is now being made by industry to identify equipment, improve vision, direct attention, and create harmonious working conditions. For example, brightly pigmented paints focus workers' eyes on critical machine parts, soft tones on background areas reduce tension and eye fatigue, and contrasting colors guide traffic on floors and aisles. As pigment producers, the Calco Chemical Division of Cyanamid works closely with paint manufacturers and other users of pigments and through research is improving the resistance of pigments to fading, discoloration, and aging.

(*Above*) **R-6 WAR HELICOPTER CABIN STRUCTURES,** made of Fiberglas bonded with LAMINAC*, Cyanamid's low-pressure laminating resin, inaugurate the use of laminated plastics on a volume basis in this type of construction. Produced by the United States Rubber Company, this material is used because of its light weight, great tensile strength, rigidity, and ability to withstand strains and excessive vibration.

(*Above*) **FOR DISTINCTIVE COSMETICS,** to meet the requirements of the fine art of make-up today, Cyanamid supplies a broad range of basic materials including AQUASOL* and NO-ODOROL* sulfonated oils, AEROSOL* wetting agents, gums, zinc and magnesium stearates, waxes, K & M magnesium oxide and carbonate, and talc.

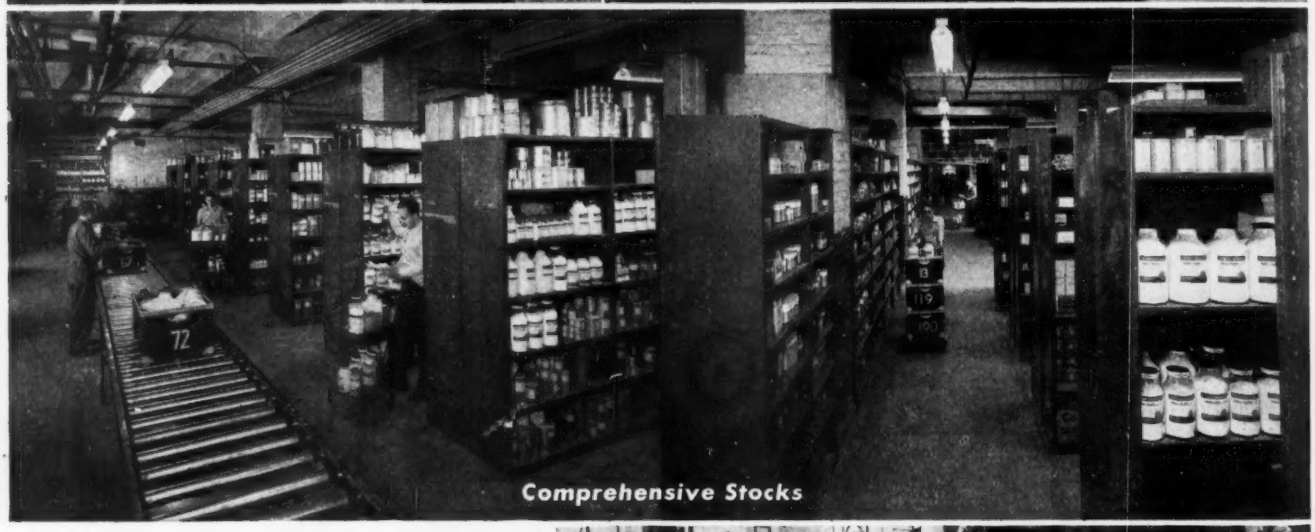
*Reg. U. S. Pat. Off.

American Cyanamid & Chemical Corporation
A Unit of American Cyanamid Company
30 ROCKEFELLER PLAZA · NEW YORK 20, N. Y.

Why EIMER AND AMEND is First Source for Laboratory Chemicals

Accurate Analyses

Manufacturing Facilities


Comprehensive Stocks

Eimer and Amend has thousands of reagents and solutions on hand for prompt delivery along with other laboratory supplies—plus the technical staff, manufacturing facilities and 94 years of "know-how" to produce special preparations, private formulas and to develop new reagents.

Eimer and Amend's stock includes:

E AND A REAGENT Chemicals	Alloys
U.S.P. and N.F. Chemicals	Biologicals
Organic Chemicals	Buffer Solutions
Standard Solutions	Indicators
Metals	Micro Chemicals

Serving Science Since 1851

Scientific Packaging

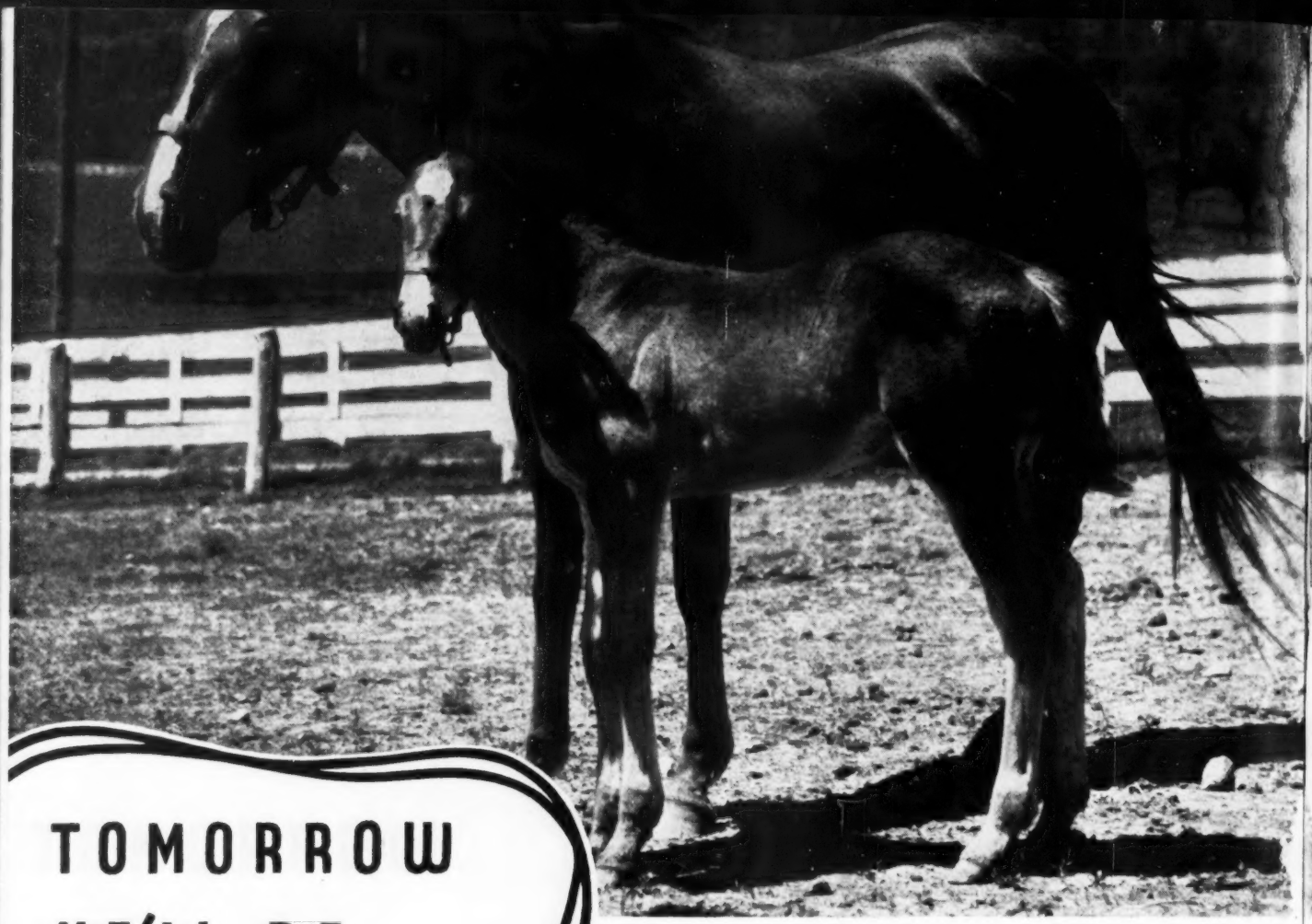
EIMER and AMEND

Headquarters for Laboratory Supplies

635 Greenwich Street • New York 14, N. Y.

Easy-pouring containers.....Plastic lures that gleam
Fiber drums to keep things dry.....And cans in a steady stream
ARE ALL MADE BY CONTINENTAL CAN COMPANY
Did you know that Continental is the 2nd largest producer of crown caps? Has complete and up-to-date facilities for fabricating plastics? Makes a full line of paper and fiber containers?
Why, then, do we still call ourselves the Continental Can Company? Well, we're pretty proud of that name. Thousands of businessmen have learned to rely on it for products and service of the highest quality.
Our main job now is making products for war. But when it's won, keep your eye on Continental and on the Continental trademark, too. You'll be seeing the Triple-C more and more in industry and in your home.
Products and Divisions of Continental Can Co.
100 E. 42nd St., New York 17, N. Y.
CONTINENTAL PRODUCTS: Metal Containers · Fiber Drums · Paper Containers · Paper Cups · Plastic Products · Crown Caps and Cork Products · Machinery and Equipment.
OPERATING DIVISIONS: The Container Co. Van Wert, Ohio · Keystone Drum Company, Pittsburgh, Pa. · Boothby Fibre Can Division, Roxbury, Mass. · Mono Containers, Newark, N. J. — Plastics Division, Cambridge, Ohio. Bond Crown & Cork Co., Wilmington, Ill. Cameron Can Machinery Co., Chicago, Ill.
FOREIGN SUBSIDIARIES: Continental Can Company of Canada, Limited, Sun Life Building, Montreal, Canada · Sociedad Industrial de Cuba, S. A., Havana, Cuba.
KEEP YOUR EYE ON CONTINENTAL — FOR PACKAGING AND PLASTIC PRODUCTS
Tune in "REPORT TO THE NATION," every Saturday over CBS coast-to-coast network.

THIS IS ANOTHER in Continental's new advertising series. It tells folks we're still mighty active in our regular business of making cans—by the carload! But this colorful campaign goes on to tell how we've expanded our facilities to bring you complete service. And we're making a startling variety of things of all kinds at Continental right now. So keep an eye open for these striking full-color ads in America's leading national magazines—Time, Newsweek, U. S. News, Business Week and Fortune. Keep an eye on Continental—and on Continental's trademark too! The Triple-C stands for *one* company with *one* policy—to give you only the very best in quality and service.



TOMORROW HE'LL BE IN THERE WINNING...

HE'S only a colt now . . . a gangling, foolish, ple
little fellow—but in a short time he'll be in the
race with his nose out in front. That's how fast time pa
We're going to win this war as quickly as we can. Heek
working day and night with high speed presses produ
millions of lithographed cans necessary for defense and
war. If you produce such a product, we can help you
your's is a peace-time consumer product, remember
Tomorrow comes quickly . . . make your plans now. Ma
we can talk about them with you. In the meantime—L
Ahead.

THE HEEKIN CAN CO., CINCINNATI, OH

HEEKIN

Lithographed Cans

WITH HARMONIZED COLORS

IMPORTANT INGREDIENT *in many a* FAMOUS PRODUCT

KELCO ALGIN

Playing an important part in the success of a wide variety of products, KELCO ALGIN continues to find increasingly widespread applications throughout the food, drug and other industries.

This is because KELCO ALGIN has unique, hydrophilic colloidal properties combined with availability, uniformity and versatility. It is available in both edible and industrial grades. It covers a wide range of viscosities. It provides a wide choice of concentrations for obtaining the correct viscosity called for by the product—as a thickening, suspending, stabilizing, emulsifying, gel-producing, film-forming or adhesive agent. And it is very economical and simple to use.

For full information on your possible use of KELCO ALGIN, you may simply write us your intended application, giving the pH range.

KELCO
REG. U.S. PAT. OFF.
REFINED ALGIN PRODUCTS

KELCO COMPANY

75 E. Wacker Drive
CHICAGO-1

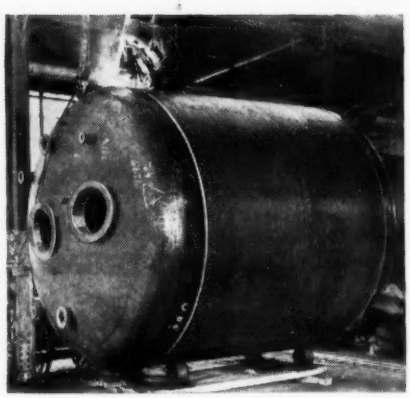
31 Nassau Street
NEW YORK-5

530 W. Sixth Street
LOS ANGELES-14

THE INERTNESS OF GLASS THE STRENGTH OF STEEL

Hatcheries FOR THE NEW ERA

● From reaction kettles like these, specially built to meet the needs of low, medium or high pressure processing, and lined with Glascote's famous "Royal Blue" glass, will come many of the new marvels of post-war era. The glass, developed by our ceramic engineers specially for the most exacting acid resistant service, is resistant to all acids at any concentration, at low or elevated temperatures, with the exception of hydrofluoric, hot concentrated phosphoric and certain concentrated alkaline solutions with which there are certain limitations. Sizes for pilot plant, semi-works or full plant operation. Let us help you select a standard, or suggest a special equipment that will meet your particular needs.



Positioning Head in 7500 Gallon Blending Tank, Preparatory to Finished Welding.

GLASCOTE PRODUCTS, INC.

20910 ST. CLAIR AVENUE • CLEVELAND 17, OHIO

ENGINEERING AND SALES REPRESENTATIVES IN THE PRINCIPAL CITIES

CORROSION RESISTANT EQUIPMENT FOR THE PROCESSING INDUSTRIES

MARBLEHEAD
High Calcium
CHEMICAL LIME

KEEPS 'EM ROLLING!

A typical railroad water treatment plant, using Marblehead High Calcium *"Chemically Pure"* Hydrated Lime.

AS in many other fields, Marblehead is aiding the war effort by helping to keep the nation's locomotives in top condition. Softening and purifying the feed water prevents scale formation — the frequent cause of boiler failures, reduction of power, expensive repairs and loss of time.

Lime-soda water treatment practically eliminates incrustants, saves fuel, makes flues and fireboxes last longer. The more calcium in the lime used, the more carbonates will be removed thus speeding the process and doing it at less cost. This is why the country's leading railroads consistently use Marblehead High Calcium *"Chemically Pure"* Hydrated Lime for more efficient water treatment.

Marblehead High Calcium Chemical Lime is also approved and widely used for water softening in municipal and government plants, raw water ice and countless industrial processes.

★ FOUR FORMS ★

TRY A CAR NOW IN YOUR OWN PLANT

POWDERED QUICK LIME | PEBBLE LIME | HYDRATED LIME | LUMP LIME

MARBLEHEAD LIME CO.

160 N. LaSalle St. Chicago 1, Ill.

Looking for a distributor?

If you're looking for product representation in the midwest, we invite you to consider G. S. Robins & Company as your distributor. Since 1923 we have been serving all industries in this territory . . . supplying them with chemicals made by America's leading manufacturers, providing them with technical assistance. Such intimate contacts keep us well advised of the needs of *all* industries, avail us excellent opportunities to recommend and sell a diversity of chemicals. We should be pleased if *your* products were among them.

G. S. Robins & Company

126 CHOUTEAU AVE.
ST. LOUIS 2, MISSOURI

Foods-Medicines-Ammunition-Supplies

. . . ALL REQUIRE MEASURED PURITY!

They are unloading war supplies in the Pacific. Precious cargo this. And the quality of practically every piece unloaded had to have an O.K. from the chemist.

FOODS frequently had to be fortified. Nutrient values had to be safeguarded. Fighting men had to be kept strong, healthy, and fit. The food chemist with one of his dependable allies, Baker's Analyzed C.P. Reagents, helped make this possible.

DRUGS—SERUMS—MEDICINES. Huge quantities were needed. Infection had to be prevented or arrested. War casualties had to be reduced—lives saved. The chemists of many drug and pharmaceutical laboratories use Baker's measured purity two ways—Baker's Analyzed C.P. Reagents to test and control quality—Baker's fine chemicals as ingredients in the products themselves.

AMMUNITION AND SUPPLIES. You know the answer here. Behind the active hands of war industry the chemist controlled the quality whether the product was ammunition, guns, jeeps, airplanes, ships, or communication systems. And back of the chemist's decisions was his reliance on his laboratory reagents.

If you have special chemical requirements for war production or in anticipation of post-war needs—if you require measured purity to predetermined standards, we invite you to discuss your problem in confidence with Baker. We may be able to help you, for Baker Chemicals are kept abreast of industry's exacting needs.

J. T. Baker Chemical Co., *Executive Offices and Plant:* Phillipsburg, New Jersey. *Branch Offices:* New York, Philadelphia and Chicago.

Baker's

Baker's Chemicals

Baker's

C. P. ANALYZED • FINE • INDUSTRIAL

Research that typifies the progress of Synthetics

THE LARGE-SCALE adaptation of laboratory synthesis to practical, highly specialized applications has greatly expanded industry's chemical horizons.

In hundreds of ways chemical engineers have gained freedom from limitations once imposed by cost or scarcity of chemical source materials.

In this progress, Celanese research—its background, its accomplishments, its basic viewpoint—has been an active factor. True to the nature of synthetics, Celanese research has created from low-cost, widely available bases, compounds exactly suited to the complex needs of many advanced processes.

Custom-built to users' specifications—and that is the way Celanese chemists prefer to work—these precision materials achieve difficult objectives and without burdensome compromises.

For instance, in supplying desirable operating qualities in plasticizers, lubricant additives, hydraulic fluids and emulsions—such as improvements in miscibility, viscosity, specific gravity, solubility, stability—Celanese research satisfies parallel needs such as reduction of flammability, corrosion, oxidation.

Insulation for modern electrical cables provides a case in point. Celanese plasticizers not only contribute added qualities of toughness and flexibility, but higher dielectric strength and greater resistance to oxidation as well.

This appreciation of interrelated factors in chemical problems, and this faith in the infinite potentials of synthetics, are shared by the entire Celanese chemical staff. Inquiries in terms of customer's specific objectives are particularly welcomed. Celanese Chemical Corporation, a division of Celanese Corporation of America, 180 Madison Avenue, New York 16, N.Y.

PLASTICIZERS

ORGANIC PHOSPHATES

LUBRICANT ADDITIVES

INTERMEDIATES

DYE-STUFFS

*Reg. U. S. Pat. Off.

TEXTILES • PLASTICS • CHEMICALS

Celanese® Chemicals

In giving transfusions of blood plasma it is vitally important that the dispensing needle be free of contamination. To assure this, the instruments are sterilized *after* packaging. The material of the container is treated with a nitrocellulose heat-sealing coating plasticized with Celluflex* 179† which withstands sterilizing temperatures and acts as a sealer until the needle is removed for use.

†Celluflex 179: petroleum base organic phosphate plasticizer.

CELANESE CORPORATION OF AMERICA

Pity the Cork Insole . . .

If it's not the heat it's the humidity

Cork insoles in tennis shoes take cruel punishment winter and summer. Damp while in use, subject to the drying action of heat during winter storage, cork composition insoles must retain perfect flexibility to be used for several seasons of hard play. Used as a flexibilizer in the bone or hide glue binders of the cork composition insoles, Arlex solves this problem. Arlex gives longer usable life to the insole than commonly used conditioners. . . . Glue binders, flexibilized with Arlex, do not tend to "soup up" at high humidity, nor give off excessive moisture in dry air—Arlex has a narrow humectant range—and as a conditioner it stays put.

ARLEX IS NON-VOLATILE

Arlex is not volatile and does not crystallize, its conditioning action is permanent. Lower polyalcohols evaporate at negligible rates in dry air at normal temperatures, but they do come off at measurable rates in moist atmosphere—in effect a low-temperature steam distillation.

So, where permanent conditioning protection is important, Arlex is your material. Get acquainted with Arlex now, ask for your copy of the Arlex book today.

USES OF ARLEX

Atlas Commercial Sorbitol Solution

Abrasives	Coatings Cosmetics	Leather Finishes	Resins, water soluble
Adhesives	Dentifrices	Paper Products	Rubber Compounding
Beverages	Diabetic Foods	Pest Control Pastes	Shoe Dressings
Cellulose Products	Emulsions	Pharmaceuticals	Textile Finishes
Cleaning Compounds	Gelatins and Glues	Printers Rollers	Tobacco

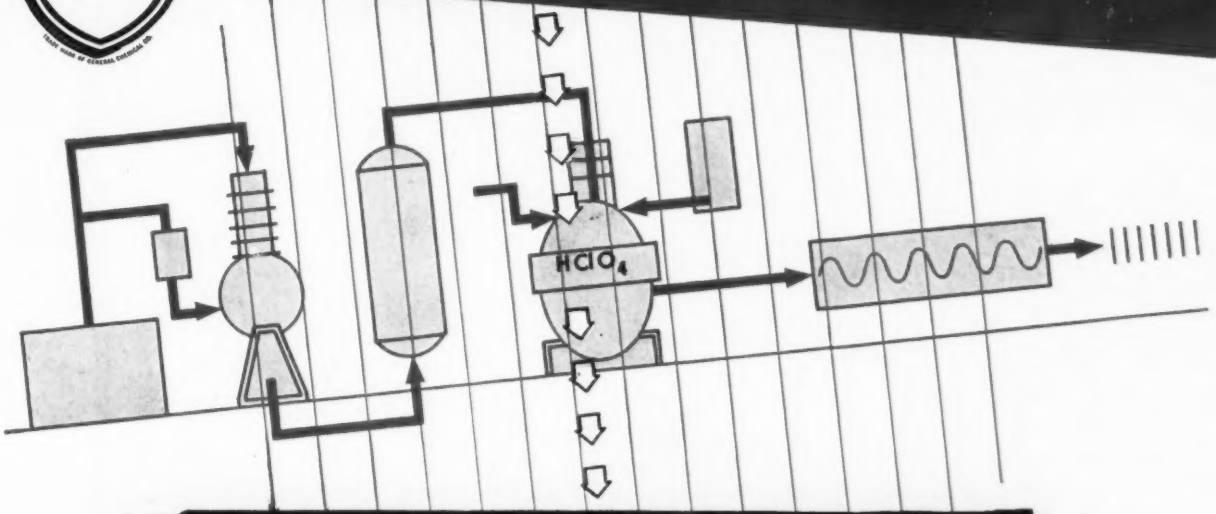
Arlex: Reg. U. S. Pat. Off.

ATLAS INDUSTRIAL CHEMICALS DEPARTMENT

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

PERCHLORIC ACID, Reagent, A. C. S. 70-72% $HClO_4$



. . . in flow sheets of the future!

NEW and varied industrial roles are being drafted today for B&A Reagent Perchloric Acid, for this "B&A Quality" product has already proved adaptable to the needs of process engineers as well as laboratory chemists.

Whatever your requirements . . . small bottle lots for laboratory applications . . . or carboy shipments by the carload for production use . . . you will find this Baker & Adamson reagent meets *exacting A. C. S. specifications.* Into its making goes all the skill and science B&A has gained in 63 years of "Setting the Pace in Chemical Purity."

Why not investigate the potentialities of this versatile product now? You may find it fills the gap in your process flow sheet as no other chemical will. Specify B&A Code No. 1144.

ACID PERCHLORIC, 70-72%, REAGENT, A. C. S.

$HClO_4$ M. W. 100.47

Assay ($HClO_4$)	70-72%

Maximum Limit of Impurities

Nonvolatile	0.003 %
Cl	0.001 %
Total N	0.001 %
NH_3	0.001 %
SO_4	0.001 %
Fe	0.0001%
Heavy Metals (as Pb)	0.0001%
SiO_2	0.001 %

In ¼, 1 or 7 lb. bottles or 70 and 165 lb. carboys
Other strengths also available

Setting the Pace in Chemical Purity Since 1882

BAKER & ADAMSON *Reagent and Fine Chemicals*

Division of GENERAL CHEMICAL COMPANY, 40 Rector St., New York 6, N. Y.

Sales and Technical Service Offices: Atlanta • Baltimore • Boston • Bridgeport (Conn.) • Buffalo Charlotte (N. C.) • Chicago • Cleveland • Denver • Detroit • Houston • Kansas City • Los Angeles Minneapolis • New York • Philadelphia • Pittsburgh • Providence (R. I.) • San Francisco • Seattle St. Louis • Utica (N. Y.) • Wenatchee • Yakima (Wash.)

In Wisconsin: General Chemical Wisconsin Corporation, Milwaukee, Wis.

In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver

a Letter to an Advertising Agency*

POROCEL CORPORATION
260 SOUTH BROAD STREET
PHILADELPHIA 1, PENNA.

N. W. Ayer & Son, Inc.
Washington Square
Philadelphia 6, Penna.

Gentlemen:

Our forthcoming advertisement should be developed with the idea of bringing the potential usefulness of Porocel as a Catalyst Carrier to those people who are looking for a better material to support, adsorb, dilute, disperse or otherwise present or dispose the active catalyst to the reacting phases.

Enumeration of the properties of Porocel which would strongly recommend it as a Catalyst Carrier would include the following:

(a) Its properties as an adsorbent. Porocel is an active adsorbent, making it possible intimately to adsorb the active catalyst from an aqueous solution, thereby presenting it in an active, dispersed form.

(b) Porocel has a high surface area. Surface area is in many cases directly related to adsorptive power, and a high surface area carrier is always desirable.

(c) Porocel is rugged. The physical hardness of Porocel is such that the granule shapes are maintained in the presence of liquid or vaporous reactants under widely varying temperatures or flow conditions.

(d) Porocel will permit exact engineering design calculations, and predicted conditions of reaction and fluid flow will be maintained throughout the life of the catalyst.

(e) Porocel is inexpensive. Compared with the cost of most active catalysts, the cost of a Porocel carrier becomes a very small item.

(f) Porocel is produced in uniform granular sizes. This is advantageous for reasons given above.

(g) Porocel is chemically inert to most active catalysts and many organic reactants. It can, therefore, be relied upon to act only as a support in most cases, and as such, not interfere with the basic reaction.

Very truly yours,

C. D. Laughlin

Porocel Corporation

cdl/jc

*This letter was written by an engineer—not an advertising man. It was intended simply to supply information for a Porocel advertisement on this page this month. But the letter was so clear and concise an outline of Porocel's properties that the copywriter said to himself, "Why gild the lily? Why not just run this letter as written and received?" . . . so here it is.

Proved in Food Products! C. P. glycerine is a food itself, substantially equivalent in food value to carbohydrate. It has high sweetening power. No wonder it's used by so many manufacturers!

Proved in Cosmetics! C. P. glycerine's non-toxicity, emollient properties, resistance to evaporation, solvent power, and compatibility make it ideal for use in many cosmetics. Use glycerine!

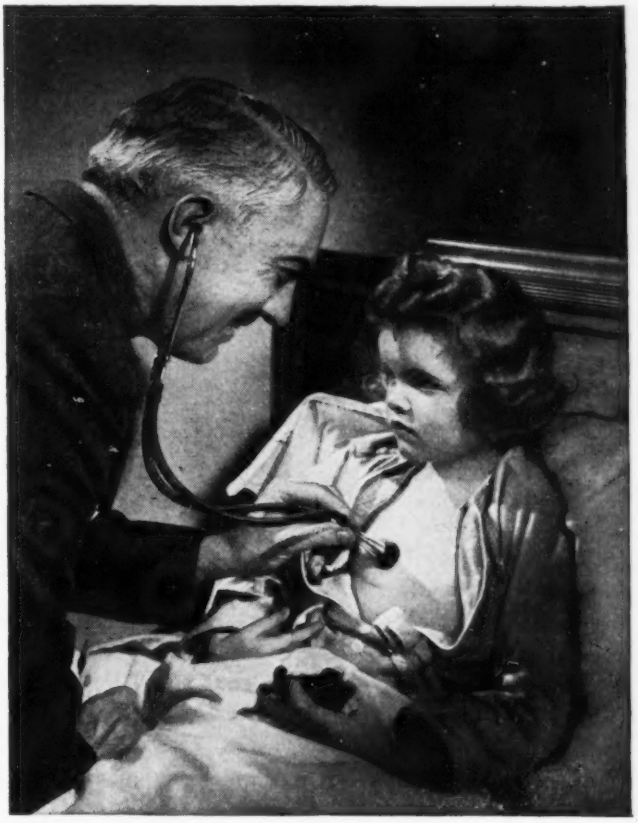
Why Glycerine is a Superior Humectant: PERMANENCE

GLYCERINE as a humectant is permanent. Its permanence is a result of its low vapor pressure, its compatibility with hydrophilic materials, and its lack of tendency to "creep."

In the absence of a permanent humectant, glues dry out and are no longer adhesive and flexible; paper wrappings become dry and brittle; tobacco gives a less smooth and mellow smoke; cosmetics and dentifrices cake and crack; certain leather products become harsh and rough.

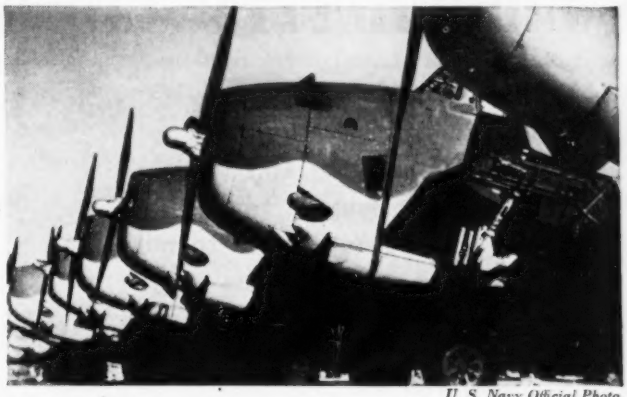
Does the adhesive on your scratch-pad or in a bookbinding become brittle? If so, the chances are that it has not been plasticized with glycerine but with some other material.

Glycerine is not only a superior humectant but a preferred plasticizer, solvent, carrier, preservative, lubricant, and key component in many essential products and materials. Its high viscosity, high solvent power, compatibility, non-toxicity, and other valuable properties can help you make superior products. Use glycerine, the time-tested ingredient, now freely available for the production of civilian goods. Glycerine Producers' Association, 295 Madison Avenue, New York 17, N. Y., Dept. N-7.



Proved in Medicines! C. P. glycerine, used as a solvent, carrier, and component of ointments, emollient solutions, plasters, and many other pharmaceuticals, is an old standby — proved safe.

Proved in Packaging! Because C. P. glycerine is non-toxic, it is used in the manufacture of transparent wrappings coming in contact with foods or food products. Use glycerine—and be sure!



U. S. Navy Official Photo.

Tough Paints! Long-lasting paints for war equipment and for widespread industrial and home use have been made possible with alkyd resins, of which glycerine is an important raw material.

Sulphuric *Acid*

The tremendous increase in the use of concentrated sulphuric acid as a catalyst or dehydrating agent in industrial processes has created numerous disposal problems for the spent acid. Frequently 95 to 98% of the acid purchased is purged from the process as a spent product. These spent acids vary widely from high quality materials to low acidity materials.

CONSOLIDATED CHEMICAL INDUSTRIES INC., recognizes its responsibility to find ways and means of disposing of spent sulphuric acid. The solution of this problem is a challenge that offers many opportunities for service to industry.

Industries that require a large tonnage of low cost acid should give careful thought to locating post war projects in the Gulf Coast area where this type of acid is available in great quantity. Write us for information concerning the strengths and grades of spent acid that are available. We are daily processing hundreds of tons of spent acid and will be pleased to assist you.

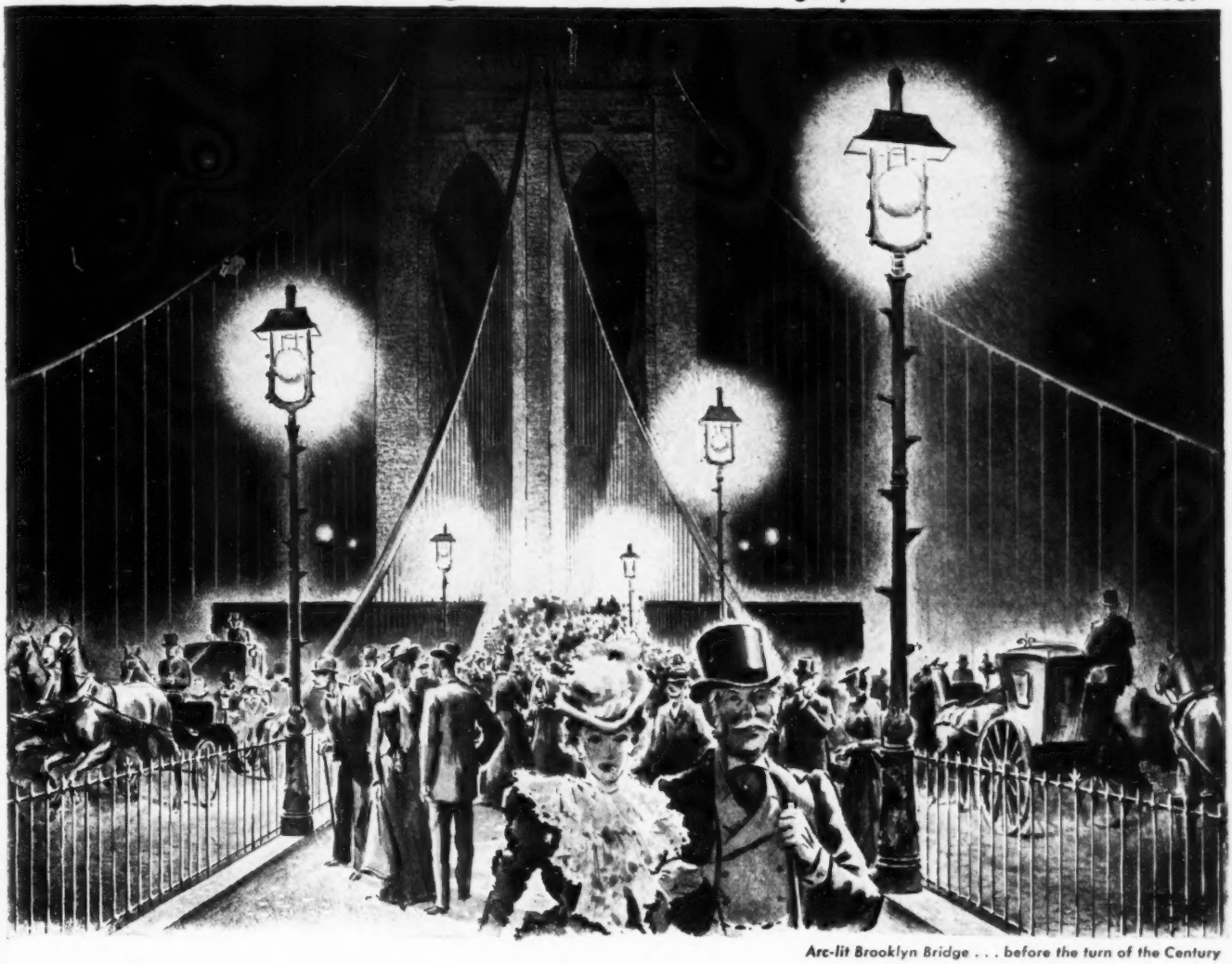
CONSOLIDATED CHEMICAL INDUSTRIES INC.

PLANT LOCATIONS
San Francisco, Cal.; Woburn, Mass.;
Baton Rouge, La.; Bastrop, La.;
Fort Worth, Texas; Houston, Texas;
Little Rock, Ark.; Buenos Aires, Argentina.

SALES OFFICES
Houston, Texas; New York, N. Y.;
San Francisco, Cal.

CCI *Products*

Number 9 of a Series: "Looking at the 5 essential things you never see in anodes!"



Arc-lit Brooklyn Bridge . . . before the turn of the Century

The Light That Has Never Gone Out!

THE CARBON-ARC STREET LAMP cast its brilliant light long and efficiently over America's great bridges and thoroughfares. Then the arc blazed ahead to become one of industry's most useful tools.

But the light from the old steet lamp still shines in the lesson it taught us . . . This was to select raw materials for fabricating carbon and graphite with extreme care!

Today much of the quality of "Acheson" graphite anodes for your electrolytic cells depends on the scientific selection of raw materials. As one result, "Acheson" anodes are more uniform. They cost less to use because of slower voltage rise and longer diaphragm life.

Raw materials selection, however, is just one of *five* essential things you *never see* in anodes. The others are manufacturing experience, manufacturing control, continuing research and customer service. You should insist on them all in anodes. We welcome inquiries.

ACHESON GRAPHITE

The word "Acheson" and the "Acheson" Seal are registered trade-marks of National Carbon Company, Inc.

NATIONAL CARBON COMPANY, INC.
Unit of Union Carbide and Carbon Corporation
UCC
GENERAL OFFICES: 30 East 42nd Street, New York 17, N.Y.
DIVISION SALES OFFICES: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco
In Canada: Canadian National Carbon Company Limited, Welland, Ontario

KEEP YOUR EYE ON THE INFANTRY . . . THE DOUGHBOY DOES IT!

Furan Compounds • Ready • NOW

Perhaps you are one of the many research chemists who have wanted to try one of the Furan compounds, but couldn't afford the time required to search the literature, set up the apparatus and go through the preparation yourself.

Perhaps you did not know (and that's probably our fault) how many of the Furan chemicals are readily available to you for your research work.

Here, for the first time, is a list of most of the Furan compounds and their common properties—ready and waiting for your experiments. All you have to do is place an order.

COMMERCIALLY AVAILABLE

COMPOUND *Chemical Formula*	Mol. Wt.	M.P. °C	B.P. °C (760 mm)	Solubility W	A	E
Furfural $C_4H_3O \cdot CHO$ Yellow liquid	96.08	−36.5	161.7	s	s	∞
Furfuryl Alcohol $C_4H_3O \cdot CH_2OH$ Amber liquid	98.10	−31	171 (750 mm)	∞	∞	∞
Hydrofuramide $(C_4H_3O \cdot CH)_3N_2$ Light brown crystals	268.26	117	250 dec.	i	s	s
Tetrahydrofurfuryl Alcohol $C_4H_7O \cdot CH_2OH$ Colorless liquid	102.13		170 to 180	∞	∞	∞
Tetrahydrofurfuryl Oleate $C_4H_7O \cdot CH_2OOC(CH_2)_7$- $CH:(CH_2)_7CH_3$ Yellow oily liquid	366.5		200 to 285 (16 mm)	i	s	s

EXPERIMENTAL QUANTITIES

*Ethyl Furylacrylate $C_4H_3O \cdot CH:CHCOOC_2H_5$ Colorless liquid	166.17	24.5	132 to 133 (18 mm)	i	s	
Furan C_4H_4O Colorless liquid	68.07		32 (758 mm)	i	s	s
*Furfural Acetone $C_4H_3O \cdot CH:CHCOCH_3$ Red brown liquid	136.14	37 to 40	229 dec.	i	s	s
*Furfural Acetophenone $C_4H_3O \cdot CH:CHCO\ C_6H_5$ Yellow, oily crystals	198.21	39 to 42	178 to 181 (8 mm)			
*Furfural Diacetate $C_4H_3O \cdot CH(OOCCH_3)_2$ Colorless crystals	198.17	50 to 51	220	i	s	s
*β-Furfuraldoxime $C_4H_3O \cdot CH:NOH$ White crystals	111.10	88 to 90	201 to 208	sl.s.c.	s	s
*Furfuryl Acetate $C_4H_3O \cdot CH_2\ OOCCH_3$ Colorless liquid	140.13		84 to 85 (25 mm.)	i	s	s
*5-Furfural-2-Thiohydantoin $C_4H_3O \cdot CH: C_3H_2N_2OS$ Green crystals	194.20	250 to 252 (247 dec.)				
*Furil $(C_4H_3OCO)_2$ Yellow needles	190.10	161 to 162		i	s	s
*α-Furil Dioxime $(C_4H_3O \cdot C:NOH)_2$ Light tan powder	220.18	164 to 168			s	s
*Furoamide $C_4H_3O \cdot CONH_2$ White powder	111.10	141 to 142	(some subl. 100°)			
Furoic Acid $C_4H_3O \cdot COOH$ White Crystals	112.03	131 to 132		s	s	s
*Furoin $C_4H_3O \cdot CHOHCOC_4H_3O$ Light brown needles	192.16	135 to 137		i	s	s
*Furoyl Chloride $C_4H_3O \cdot COCl$ Colorless liquid	130.53	−2 to 0	176	dec	s	s
*Furylacrolein $C_4H_3O \cdot CH:CHCHO$ Yellow crystals	122.12	51	200	i	∞	s
*Furylacrylamide $C_4H_3O \cdot CH:CHCONH_2$ Light tan crystals	137.13	167 to 168		i		
*Furylacrylic Acid $C_4H_3O \cdot CH:CHCOOH$ White crystals	138.12	141	226; 117 (8 mm)	i	s	s
Methyl Furan $C_4H_3O \cdot CH_3$ Colorless liquid	82.10		62 to 63	i	s	s
Tetrahydrofuran C_4H_8O Colorless liquid	72.10	−65	66	∞	∞	∞
*Tetrahydrofurfuryl Acetate $C_4H_7O \cdot CH_2OOC \cdot CH_3$ Colorless liquid	144.17		84 to 86 (14 mm) 91 to 92 (16 mm)	i	s	s
*Tetrahydrofurfuryl Adipate $(C_4H_7O \cdot CH_2OOC)_2$- $(CH_2)_4$ Yellow liquid	314.37	5 to 15	200 to 207 (1.5 mm)	i	s	s
*Tetrahydrofurfuryl Benzoate $C_4H_7O \cdot CH_2OOCC_6H_5$ Colorless liquid	206.23		143 to 145 (3 mm)	i	s	s
*Tetrahydrofurfuryl Palmitate $C_4H_7O \cdot CH_2OOC$- $(CH_2)_{14}CH_3$ Colorless liquid	340.53		195 to 19 (1.5 mm)	i	s	s
*Tetrahydrofurfuryl Propionate $C_4H_7O \cdot CH_2OOC \cdot C_2H_5$ Colorless liquid	158.19		100 to 102 (18 mm)	i	s	s
*Tetrahydrofurfuryl Salicylate $C_4H_7O \cdot CH_2OOC \cdot$ C_6H_4OH Colorless liquid	222.23		131 to 133 (2 mm)	i	s	s

W = Water, A = Ethyl Alcohol, E = Diethyl Ether

NOTE: *Substituent groups in the Furan Ring are in the "2" position unless otherwise indicated.*

Compounds marked * may be purchased directly from the Eastman Kodak Company, Rochester, New York. Samples of the others are available to those who see in them a possible application to their problems. Company letterhead should be used when writing.

Further information on Furfural and other Furan chemicals will be furnished upon request. In asking for information, please give us as many details about your problem as you can. We can then give you more specific and pertinent information about the Furans as applied to your particular needs.

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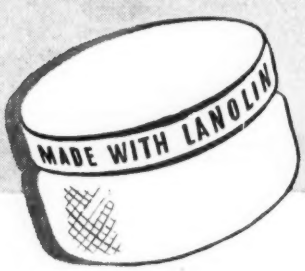

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Chemical producers, more and more, are resorting to adsorption, the newest tool in the purification field, and Nuchar Activated Carbon, with its great inherent reserve power and surface area, is a veritable "powerhouse" adsorbent, which readily lends itself to polishing up and purification processes.

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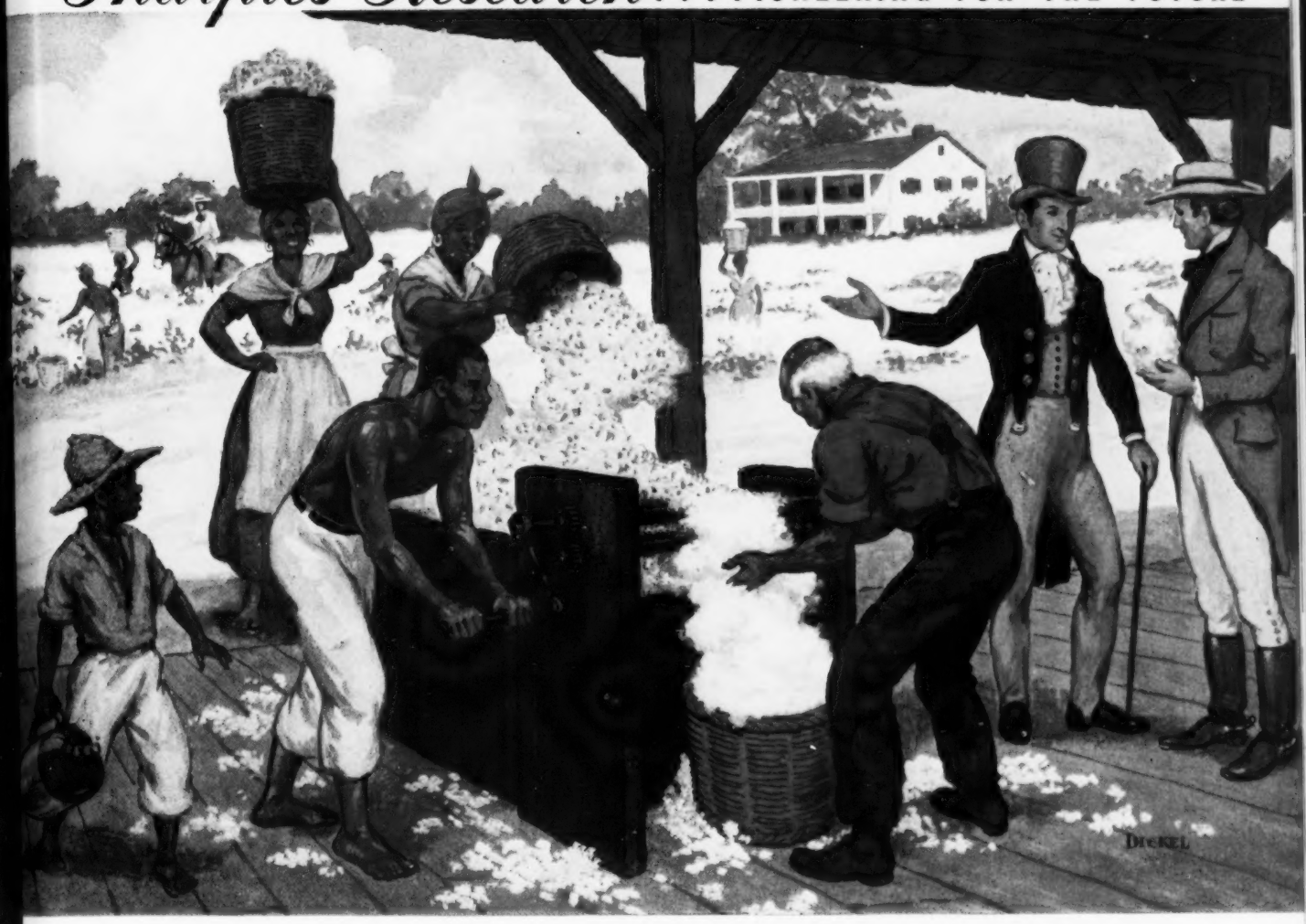

Eli Whitney's invention of the cotton gin in 1792 made possible the commercial production of cotton in the southern states. Within a decade, after his first machine was built, cotton was the economic cornerstone of the lower South.

THROUGHOUT history, living standards have been raised by advancements in mechanical equipment, industrial processes and products. Each development representing an improvement is a step ahead. The advent of amines, over the past few years, as commercial chemicals has made possible the development of new and improved products finding application in a number of chemical fields.

Like other members of the ever-growing family of Sharples amines, the new compounds described in the table show a wide versatility of reactions. Possible uses include the synthesis of oil additives, pharmaceuticals, rubber chemicals, insecticides, dyestuffs, inhibitors, the manufacture of enamels and lacquers, and the preparation of surface active agents. Undoubtedly, a wealth of undeveloped applications lies behind the classic reactions and the resulting products.

While these particular amines are available currently only in experimental quantities, commercial scale production is planned for post-war. Your request for samples, submitted on company letterhead, will receive prompt attention.

NEW SHARPLES AMINES

(Secondary Alkylamines)

Name	Formula	Mol. Wt. (Calcd.)	Boiling Range °C.	Sp. Gr. at 20/20° C.	Solubility in		
					Water	Alcohol	Benzene
Di-n-amylamine	$(C_5H_{11})_2NH$	157.3	198-202	0.778	Partial	Complete	Complete
Di-n-hexylamine	$(C_6H_{13})_2NH$	185.3	223-231	0.790	Negligible	Complete	Complete
Di-n-heptylamine	$(C_7H_{15})_2NH$	213.4	270-280	0.793	Negligible	Complete	Complete
Di-n-octylamine	$(C_8H_{17})_2NH$	241.4	290-310	0.802	Negligible	Complete	Complete

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DIAMYLPHENOXY ETHANOL

MONOAMYLAMINE DIAMYLAMINE TRIAMYLAMINE
MONOBUTYLAMINE DIBUTYLAMINE TRIBUTYLAMINE
MONOETHYLAMINE DIETHYLAMINE TRIETHYLAMINE

DIETHYLAMINOETHANOL
ETHYL MONOETHANOLAMINE ETHYL DIETHANOLAMINE
MIXED ETHYL ETHANOLAMINES
DIBUTYLAMINOETHANOL
BUTYL MONOETHANOLAMINE BUTYL DIETHANOLAMINE
MIXED BUTYL ETHANOLAMINES

MIXED AMYL CHLORIDES DICHLOROPENTANES
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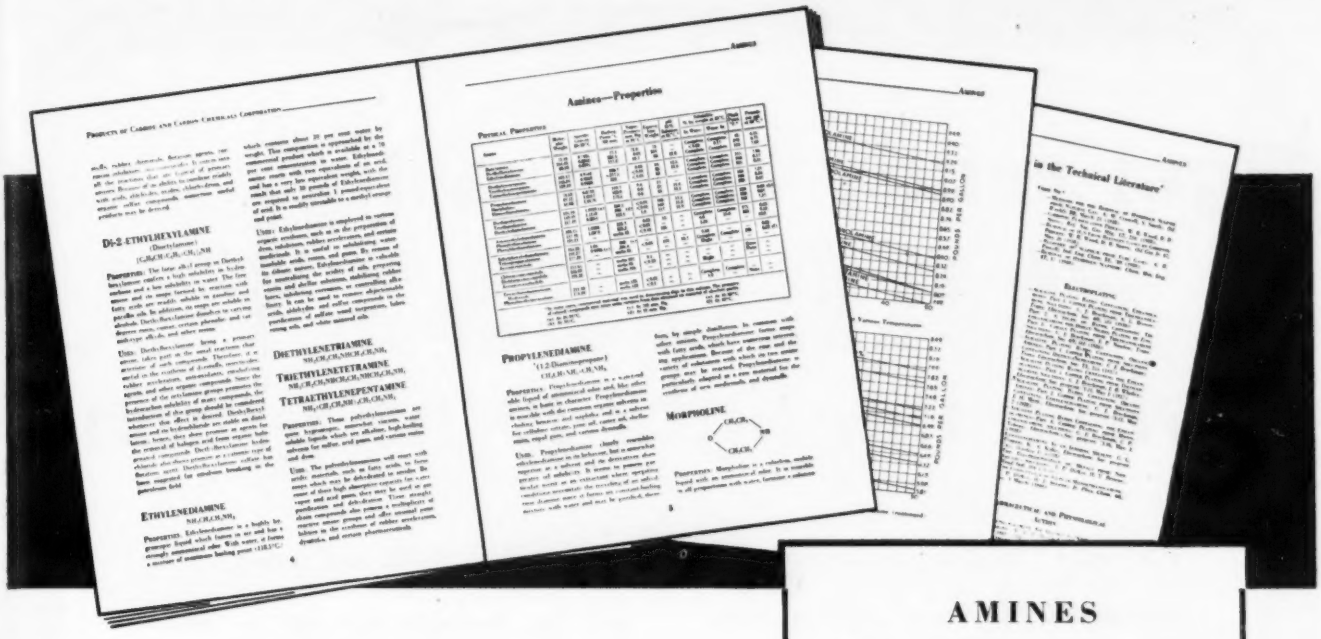

"AMINES"

This booklet is crammed with useful information about these interesting compounds

THE 25 amines produced on a commercial scale by Carbide and Carbon Chemicals Corporation are used in emulsifiers for polishes, cosmetics, insecticides, and cutting oils. They are also used as carbon-removers, corrosion-inhibitors, and acid gas absorbents, and as intermediates in the production of dyes, detergents, photographic compounds, rubber products, and certain pharmaceuticals.

Included in the booklet are general descriptions, physical properties (including graphs), specifications, and applications of these important chemical raw materials, as well as helpful bibliography.

You can have a copy of the booklet, "Amines," by writing for it. There is no obligation. Similar booklets are available on "Glycols," "Organic Acids," and "Columbia Activated Carbon." We will be glad to send you a copy of whichever ones you need.

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Diethylenetriamine
Triethylenetetramine
Tetraethylenepentamine
Propylenediamine

•

Monoethanolamine
Diethanolamine
Triethanolamine
Methyldiethanolamine
Dimethylethanolamine
Diethylethanolamine
Aminoethylethanolamine
Phenylethanolamine
Phenyldiethanolamine
Ethylphenylethanolamine
Triisopropanolamine
Tetraethanolammonium Hydroxide

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Butylamine
Diethylhexylamine

•

Acetoacetanilide
Chloracetoacetanilide
Dichloracetoacetanilide
Acetoacet-o-toluidide

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Morpholine
Phenylmethylpyrazolone

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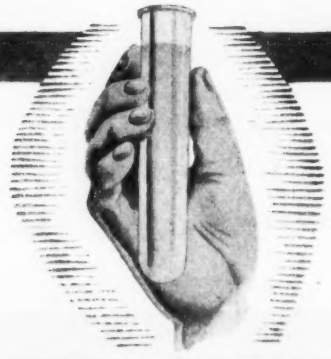

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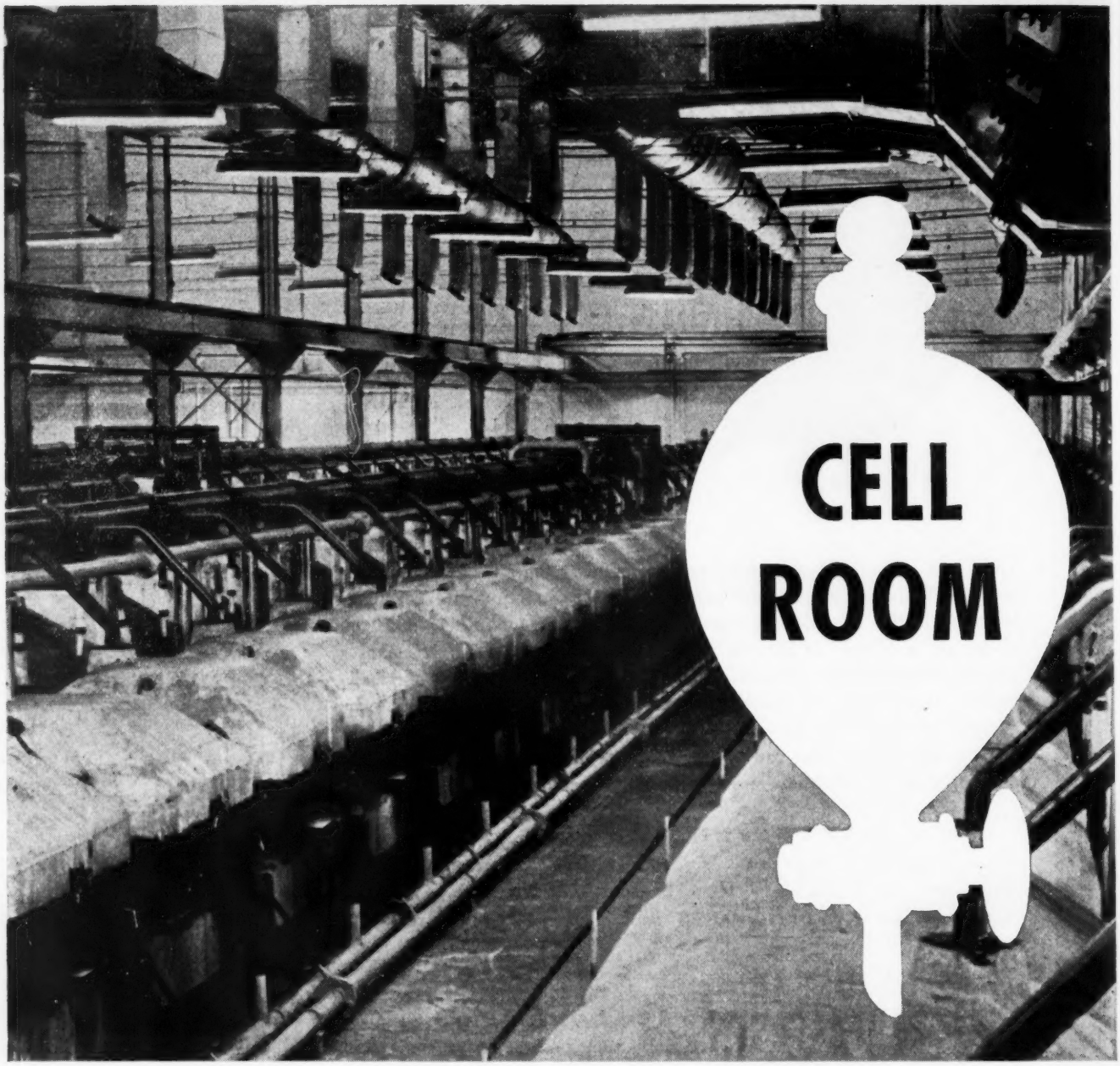

• Cell room in a Chlorine plant of the Wyandotte Chemicals Corporation at Wyandotte, Michigan. Except for the hum of the enormous electric voltage, stillness reigns here. It's truly a deathly stillness — for Wyandotte Chemicals Corporation Chlorine is at present government-allocated and largely devoted to the uses of war.

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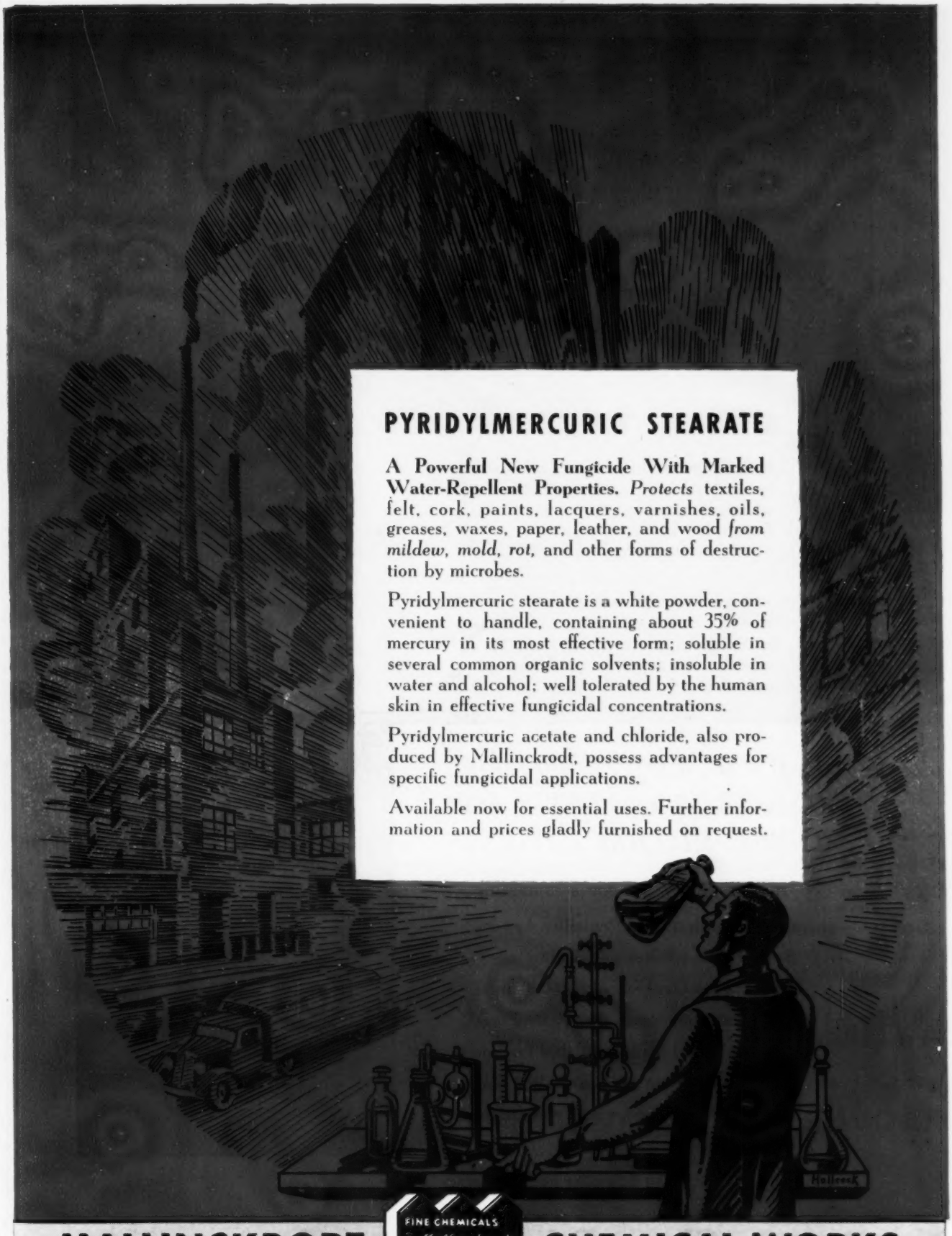

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Pyridylmercuric stearate is a white powder, convenient to handle, containing about 35% of mercury in its most effective form; soluble in several common organic solvents; insoluble in water and alcohol; well tolerated by the human skin in effective fungicidal concentrations.

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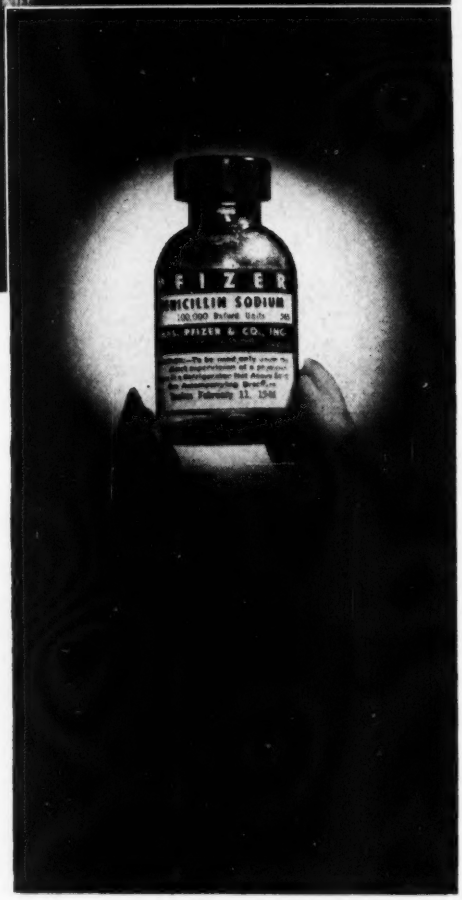

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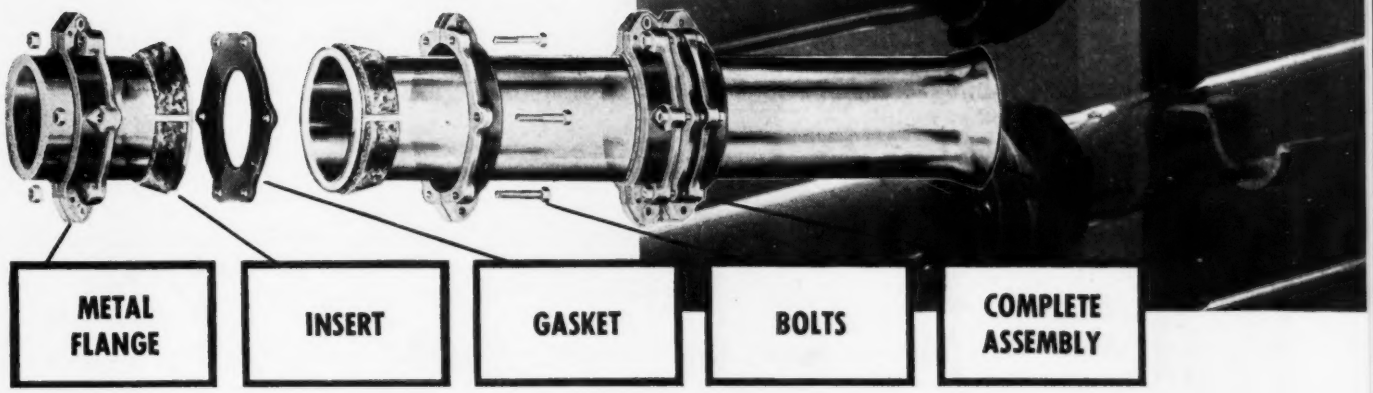
PYREX PIPE



Making a tight joint with PYREX Pipe is easy. It's an A, B, C operation that any careful workman can perform. No special tools or training are required.

HERE'S HOW IT'S DONE

1. Mount metal flanges on pipes before they are placed in hangers. Inserts can be handled easier if they are curled over sharp radius before insertion in flange.

2. Flanges should be pulled up on the inserts so that the metal flange face is nearly flush with the end surface of the insert.

3. Gaskets should be lined up with the inner surface of the pipe so that no part protrudes into the pipe to cause obstruction to flow. To avoid slippage, gaskets should be kept thoroughly dry during installation.

4. As the pipe lengths are put into place, tighten the flange bolts enough to bring the glass pipe ends snug against the gasket, but not enough to compress it.

5. When all pipes and fittings are connected and the line is complete, begin at fixed end and work to the opposite end tightening the flange bolts. Do this evenly and pull them up quite tightly. Use a 6″ or 8″ end-wrench if possible.

Once installed, PYREX Pipe brings to your processing operations many important advantages. Its transparency permits you to inspect product flow and condition at every stage of processing. Its resistance to thermal shock allows flushing of lines with steam or hot water for visible cleanliness. Its chemical stability virtually eliminates corrosion, contamination, scaling and pitting. It is rugged enough to meet plant operating conditions. For further information, write Industrial Sales Dept., CI-6.

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METHYL ETHYL KETONE

$CH_3-\overset{O}{\overset{\|}{C}}-CH_2-CH_3$

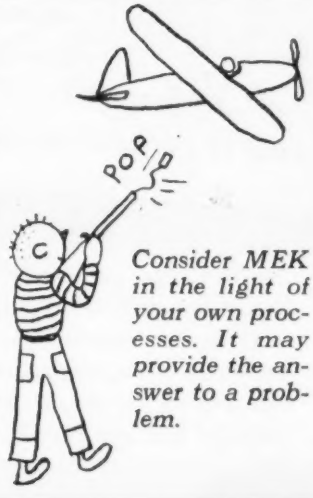
Molecular Weight 72.10

Methyl Ethyl Ketone has superior solvent properties . . . sufficiently low boiling point to permit ready recovery. It is not subject to hydrolysis and thus does not form acids corrosive to metals.

MEK is valuable in lubricating oil dewaxing because of its high solvent powers for oil.

MEK forms coating, dipping and spraying compositions with certain vinyl and cellulose resins. Thus it helps to make raincoats, tents, artificial leather for handbags and luggage, bathing suits, oilcloth, etc., stronger, better-wearing, water-proof and scuff-resistant.

MEK is important as a solvent in the manufacture of rubber cement widely used in fabricating bullet-proof gas tanks. Its excellent solvent properties are also valuable in the printing and lithographing industries.



Consider MEK in the light of your own processes. It may provide the answer to a problem.

SPECIFICATIONS

Purity	Minimum 99% methyl ethyl ketone by weight
Specific Gravity 20°/20° C.	0.805 to 0.807
Color	Maximum 10 platinum cobalt (Hazen) standard
Water	Miscible without turbidity with 19 volumes of 60° Bé. gasoline at 20° C.
Acidity (other than carbon dioxide)	Maximum 0.003% calculated as acetic acid
Distillation Range (A.S.T.M. D268/33)	Below 79° C. None Above 80.5° C. None
Non-volatile Matter	Maximum 2 mg. per 100 ml.
Weight	6.72 lbs. per gal. at 20° C. (approx.)

PHYSICAL PROPERTIES

Several of the physical properties of methyl ethyl ketone are given in the following table:

Specific Gravity at 20°/4° C.	0.8047
Boiling Point at 760 mm.	79.6° C.
Melting point	−86.4° C.
Flash point, Tag Open Cup	34° F.
Tag Closed Cup	28° F.
Vapor Pressure at 0° C.	24.3 mm. Hg.
10° C.	42.5 " "
20° C.	71.2 " "
30° C.	114.3 " "
Specific Heat	0.55 (20° to 78°C.)
Latent Heat of Vaporization	106.0 gm. cal. per gm. (20° C.)
Refractive Index, N_D^{20}	1.3788
Coefficient of Expansion	0.00076 per °F.
Explosive Limits of Vapor with Air	
Upper	10.2% methyl ethyl ketone
Lower	1.97% methyl ethyl ketone
Miscibility	Complete with nearly all organic liquids

Water azeotrope containing 88.7% by weight of MEK boils at 73.4° C. Also forms azeotropes with some of common lacquer solvents.

For further properties and uses communicate with either of the addresses below.

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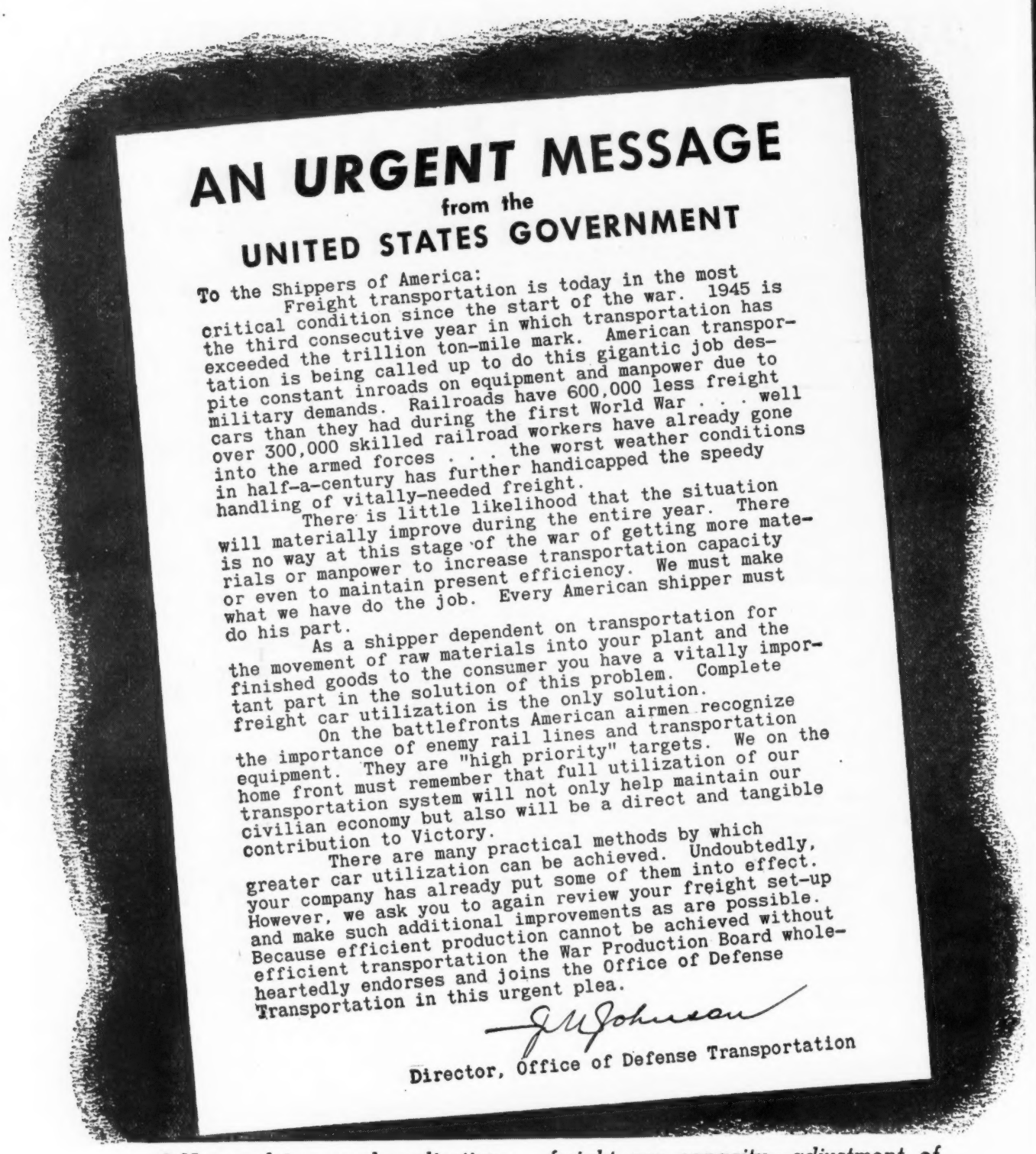
R.W. GREEFF & CO. *Eastern Sales Agent* 10 ROCKEFELLER PLAZA, NEW YORK 20. TRIBUNE TOWER, CHICAGO 11


AN URGENT MESSAGE
from the
UNITED STATES GOVERNMENT
To the Shippers of America:
Freight transportation is today in the most critical condition since the start of the war. 1945 is the third consecutive year in which transportation has exceeded the trillion ton-mile mark. American transportation is being called up to do this gigantic job despite constant inroads on equipment and manpower due to military demands. Railroads have 600,000 less freight cars than they had during the first World War . . . well over 300,000 skilled railroad workers have already gone into the armed forces . . . the worst weather conditions in half-a-century has further handicapped the speedy handling of vitally-needed freight.
There is little likelihood that the situation will materially improve during the entire year. There is no way at this stage of the war of getting more materials or manpower to increase transportation capacity or even to maintain present efficiency. We must make what we have do the job. Every American shipper must do his part.
As a shipper dependent on transportation for the movement of raw materials into your plant and the finished goods to the consumer you have a vitally important part in the solution of this problem. Complete freight car utilization is the only solution.
On the battlefronts American airmen recognize the importance of enemy rail lines and transportation equipment. They are "high priority" targets. We on the home front must remember that full utilization of our transportation system will not only help maintain our civilian economy but also will be a direct and tangible contribution to Victory.
There are many practical methods by which greater car utilization can be achieved. Undoubtedly, your company has already put some of them into effect. However, we ask you to again review your freight set-up and make such additional improvements as are possible. Because efficient production cannot be achieved without efficient transportation the War Production Board wholeheartedly endorses and joins the Office of Defense Transportation in this urgent plea.
J. M. Johnson
Director, Office of Defense Transportation

● New and improved applications of Signode Steel Strapping to specific problems are being made constantly. They contribute directly to the purposes stated by the Director of Defense Transportation: *Fuller utilization of freight car capacity—adjustment of loads to different types of cars, trucks and ships—stowage and bracing to avoid damage—rapid loading and unloading to avoid tie-up of urgently needed rolling stock.*

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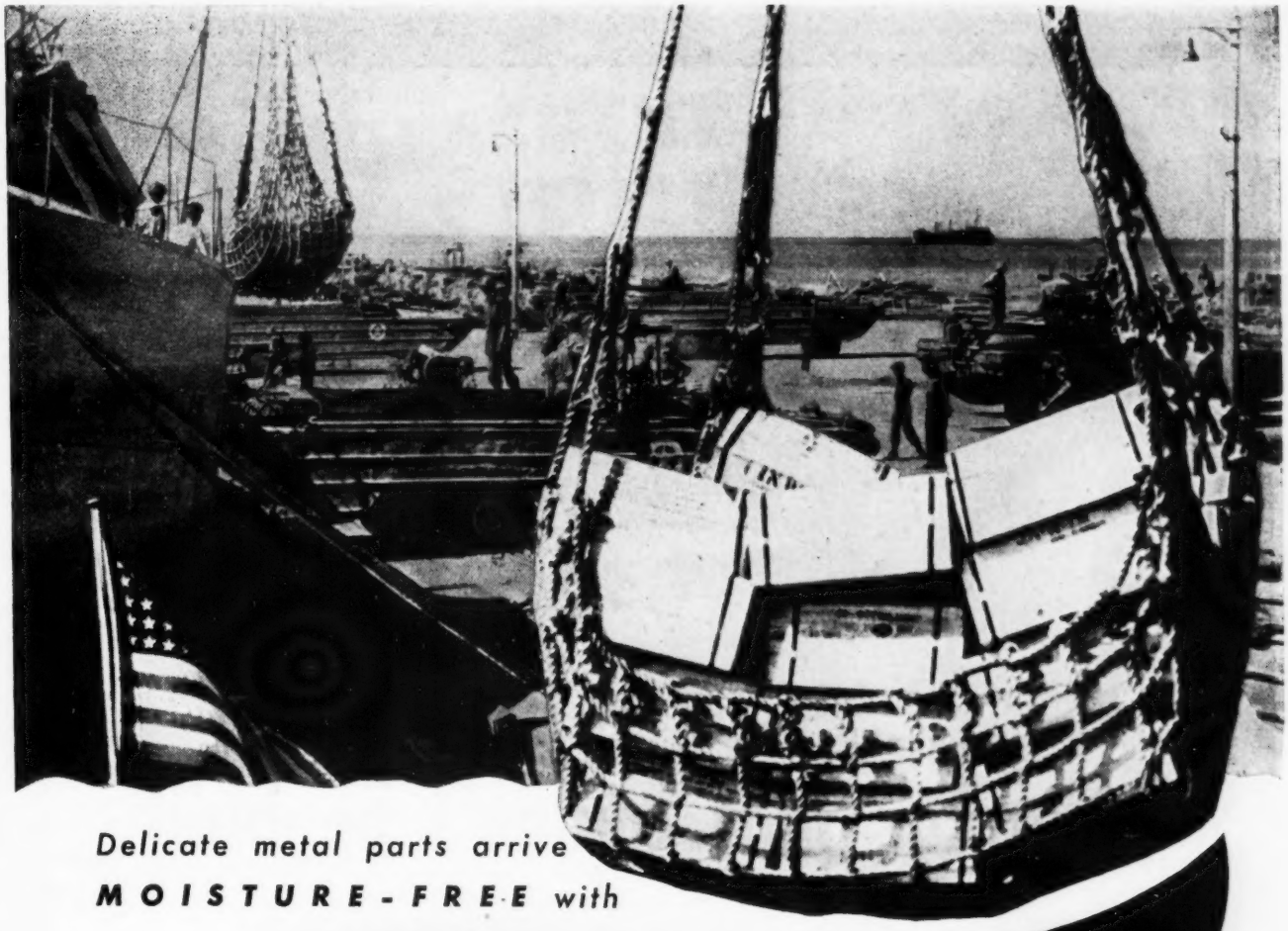

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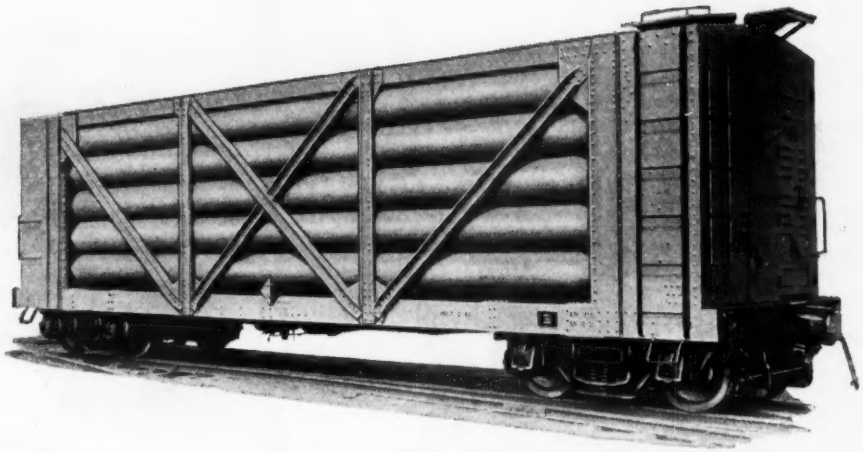

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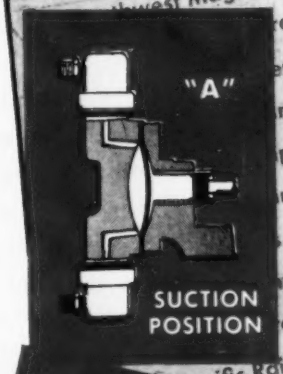

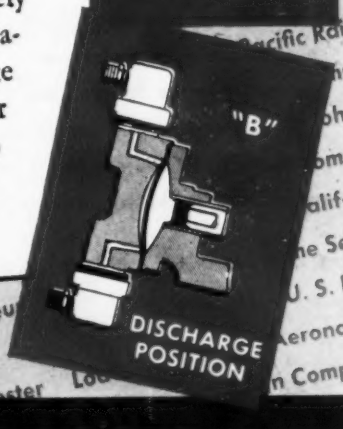

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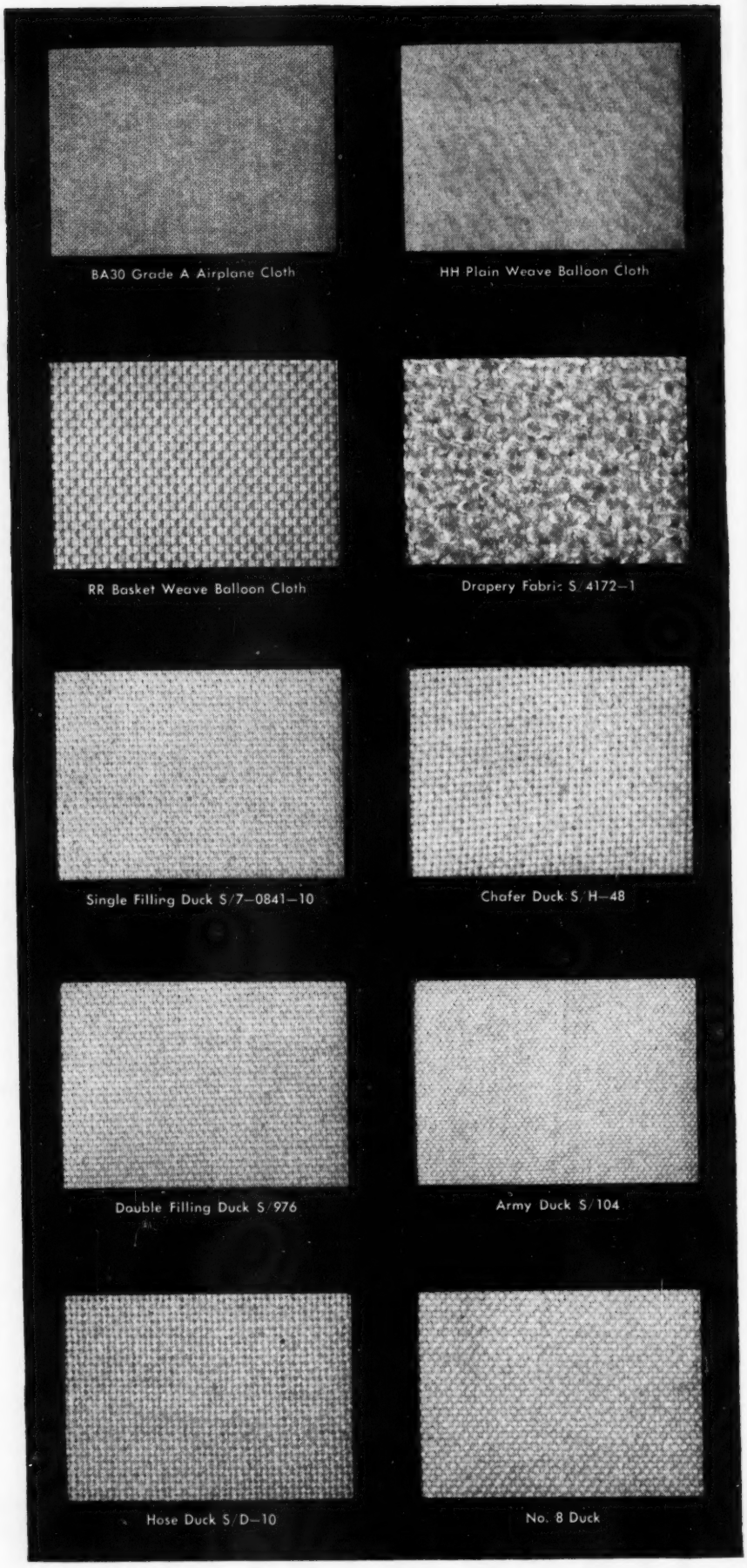

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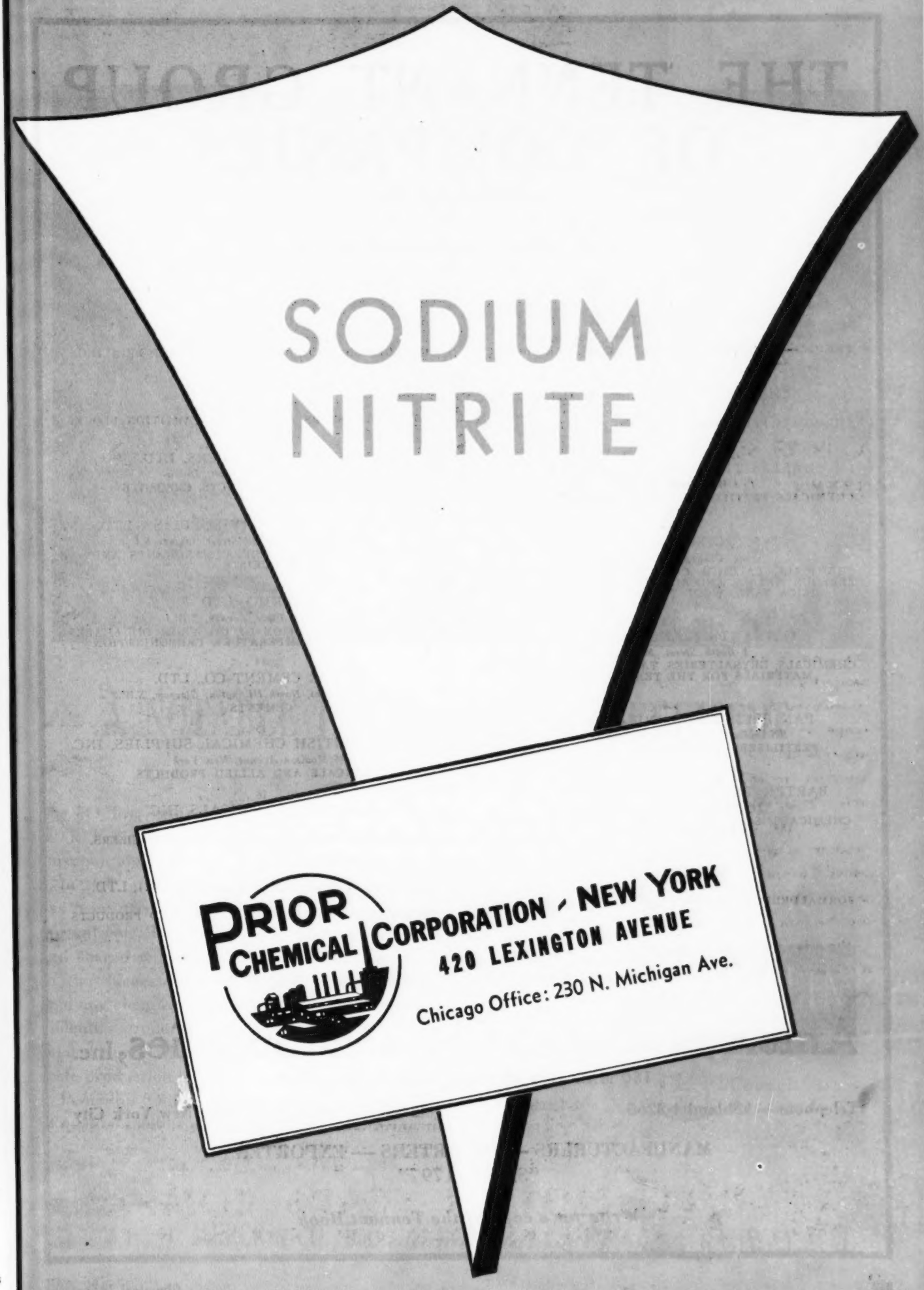
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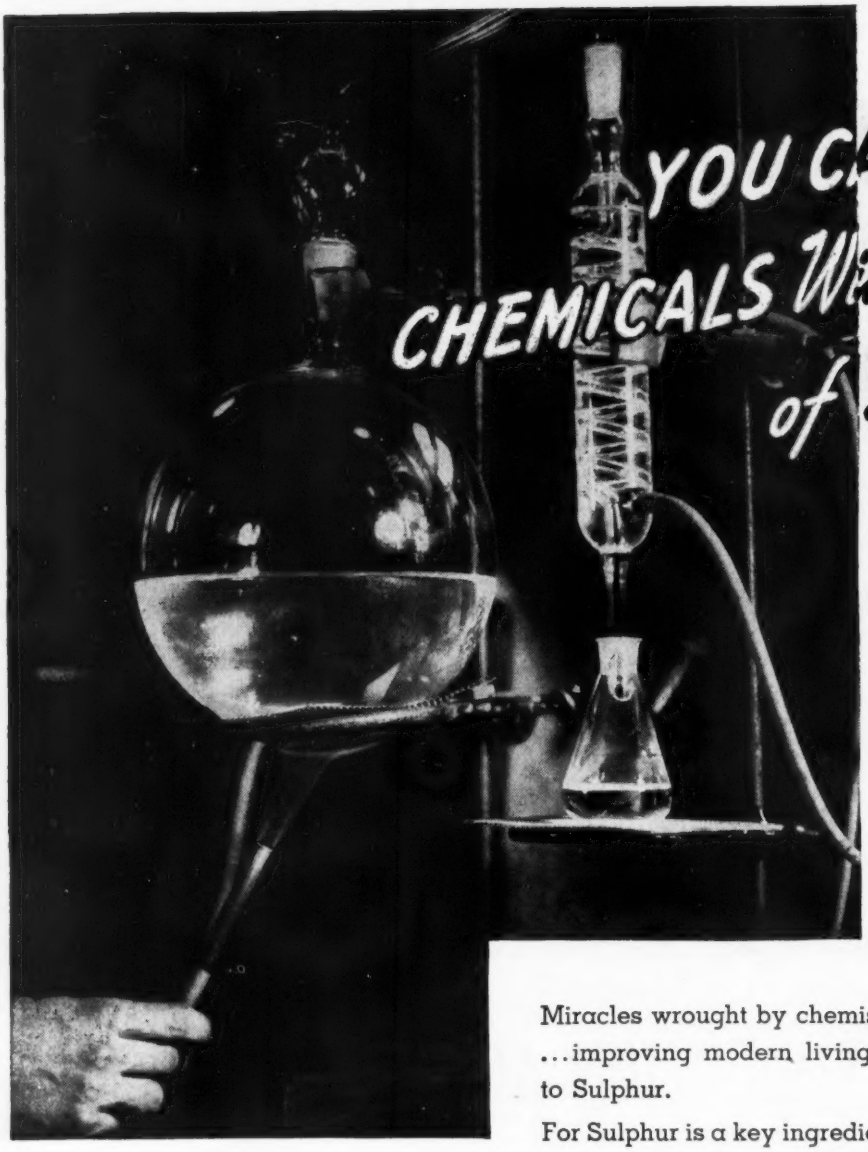

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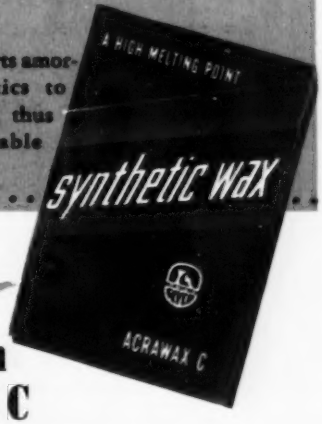

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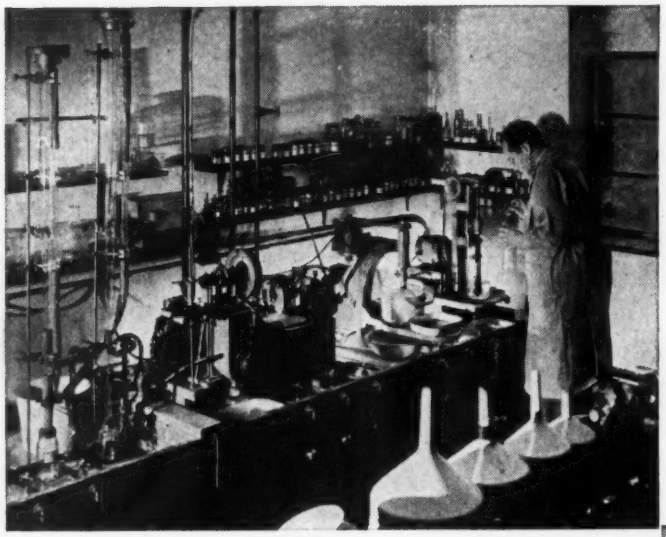

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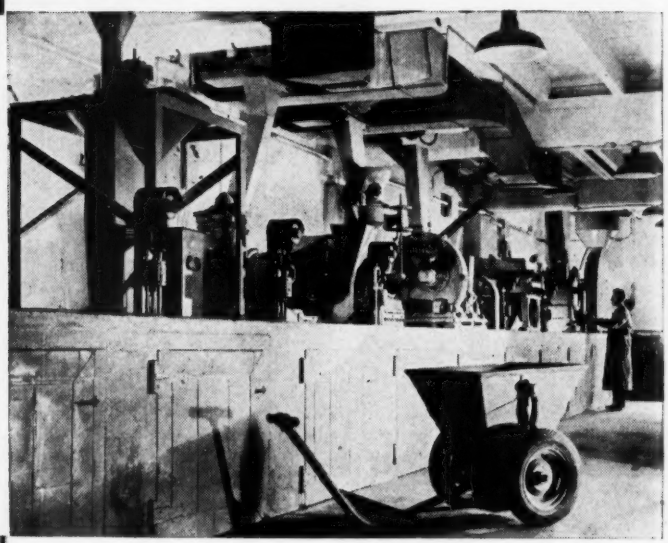

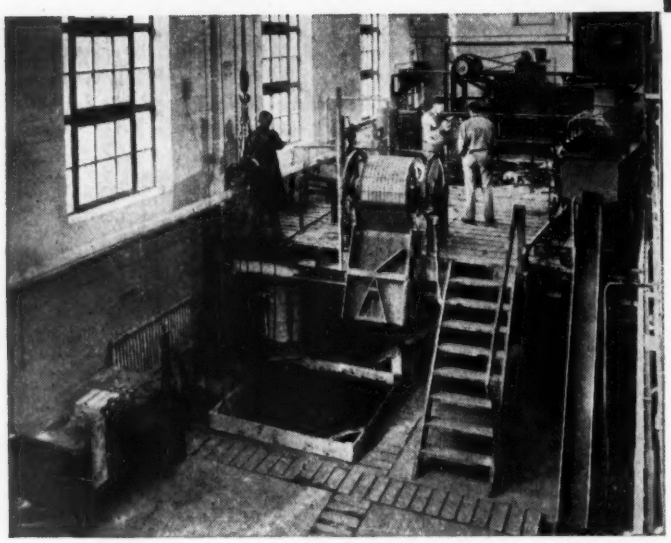

Top: A corner in one of the laboratories at Westport. *Right:* The crushing bench in the Semi-Works Plant. *Above:* Another view in the Semi-Works Plant.

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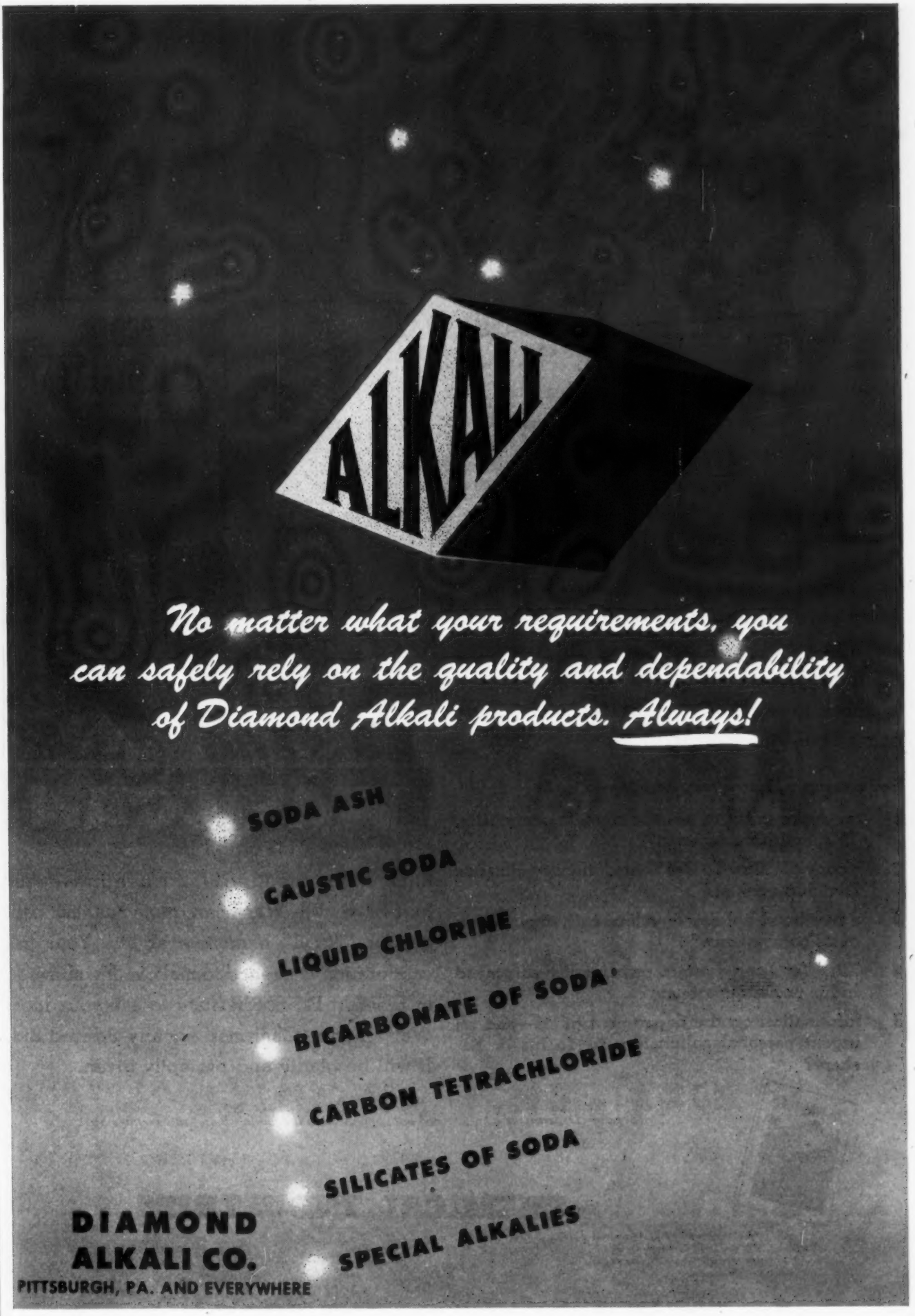
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3. a new bond-holding envelope with explanation of its convenience?
4. 7th War Loan posters prominently displayed in his or her department?
5. information on the department quota—and an urgent personal solicitation to do his or her share?

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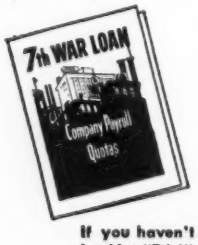

If you haven't a copy of this important booklet, "7th War Loan Company Quotas," get in touch immediately with your local War Finance Chairman.

The Treasury Department acknowledges with appreciation the publication of this message by

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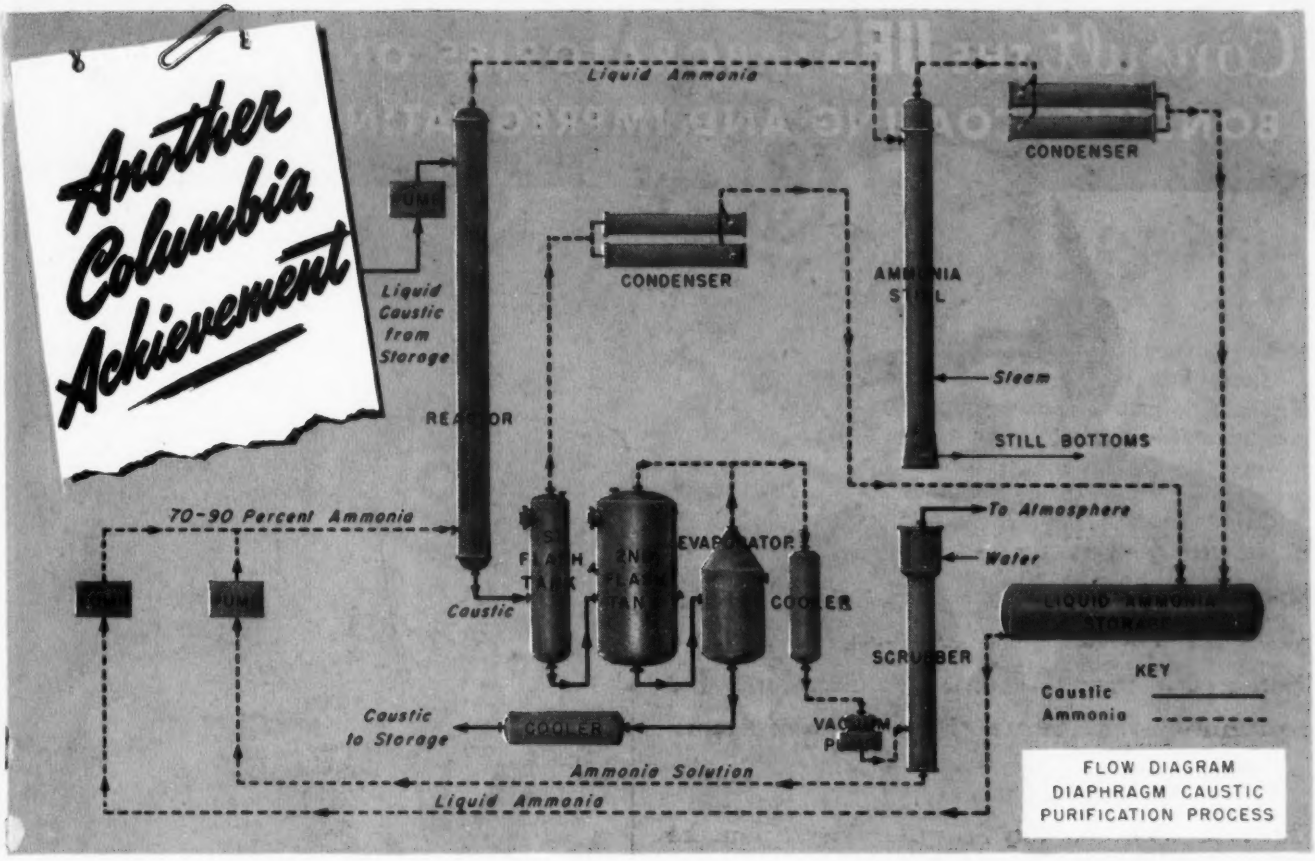

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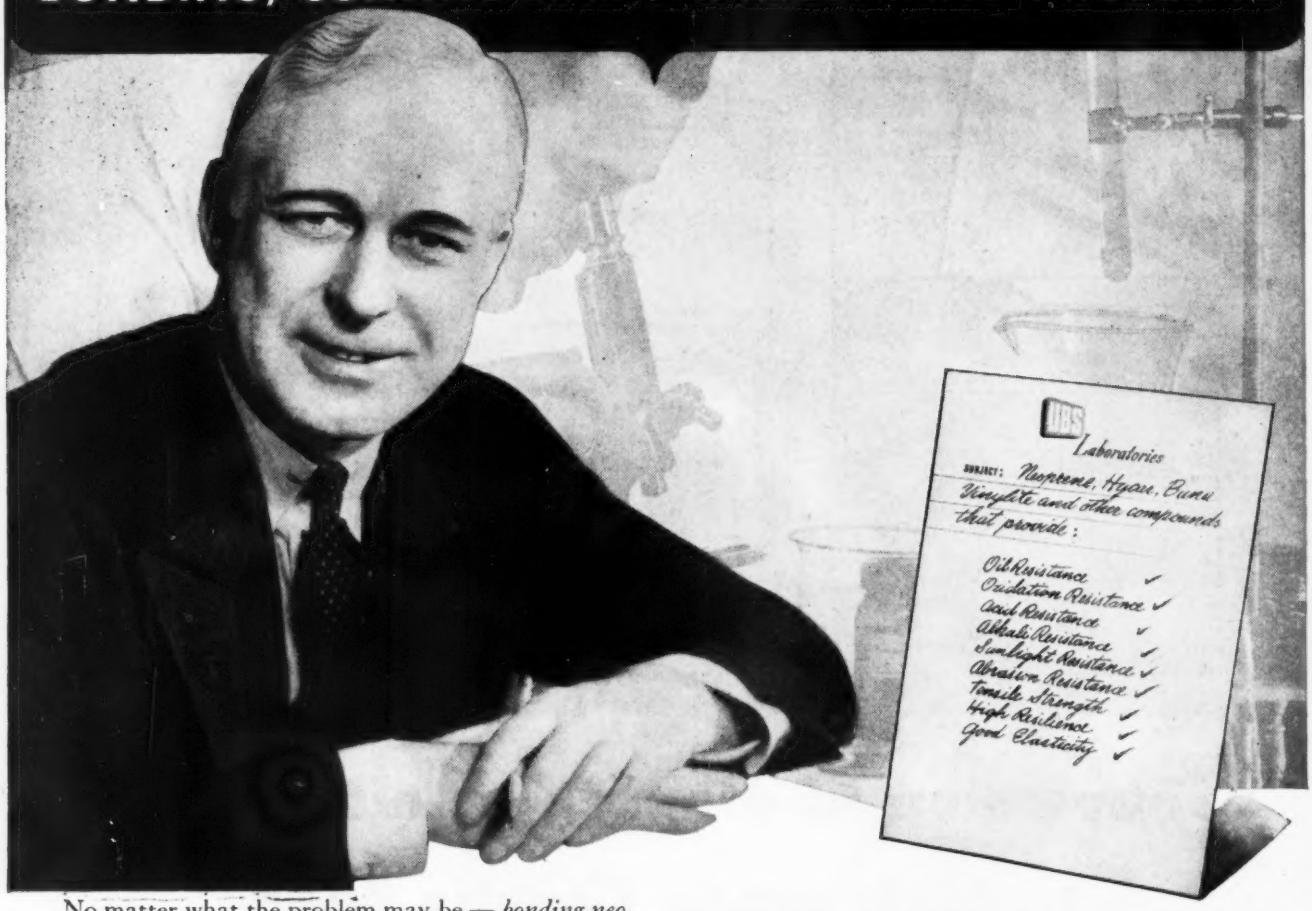
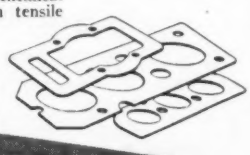
Consult THE UBS LABORATORIES ON POST-WAR BONDING, COATING AND IMPREGNATING PROBLEMS



No matter what the problem may be — *bonding neoprene, rubber and other coated or moulded parts to any ferrous or non-ferrous metal; corrosion proofing chemical tanks and equipment; laminating leather belting; coating magneto parts; combining or coating fabrics; impregnating paper; cementing various materials together; insulating wire and other articles; etc.* — you will find the UBS Laboratories equipped to provide (or develop) a formula that will fill your needs. Long-time specialists in the field of industrial Bonding, Coating and Impregnating Compounds, the UBS Laboratories not only know thoroughly the compounding advantages and limitations of all the latest synthetics, but even have developed an original synthetic latex and synthetic rubber of their own. *Write today, describing your Bonding, Coating, or Impregnating Problems.*

UBS developed adhesives are being used in the manufacture of inflatable Army and Navy Equipment, where weather and chemical resistant seams of high tensile strength are required.



UBS developed compounds are being successfully used to coat magneto parts and for cementing gaskets, where oil resistance is of great importance.

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Address all inquiries to the Union Bay State Chemical Company, Rubber Chemicals Division, 50 Harvard Street, Cambridge 42, Massachusetts.

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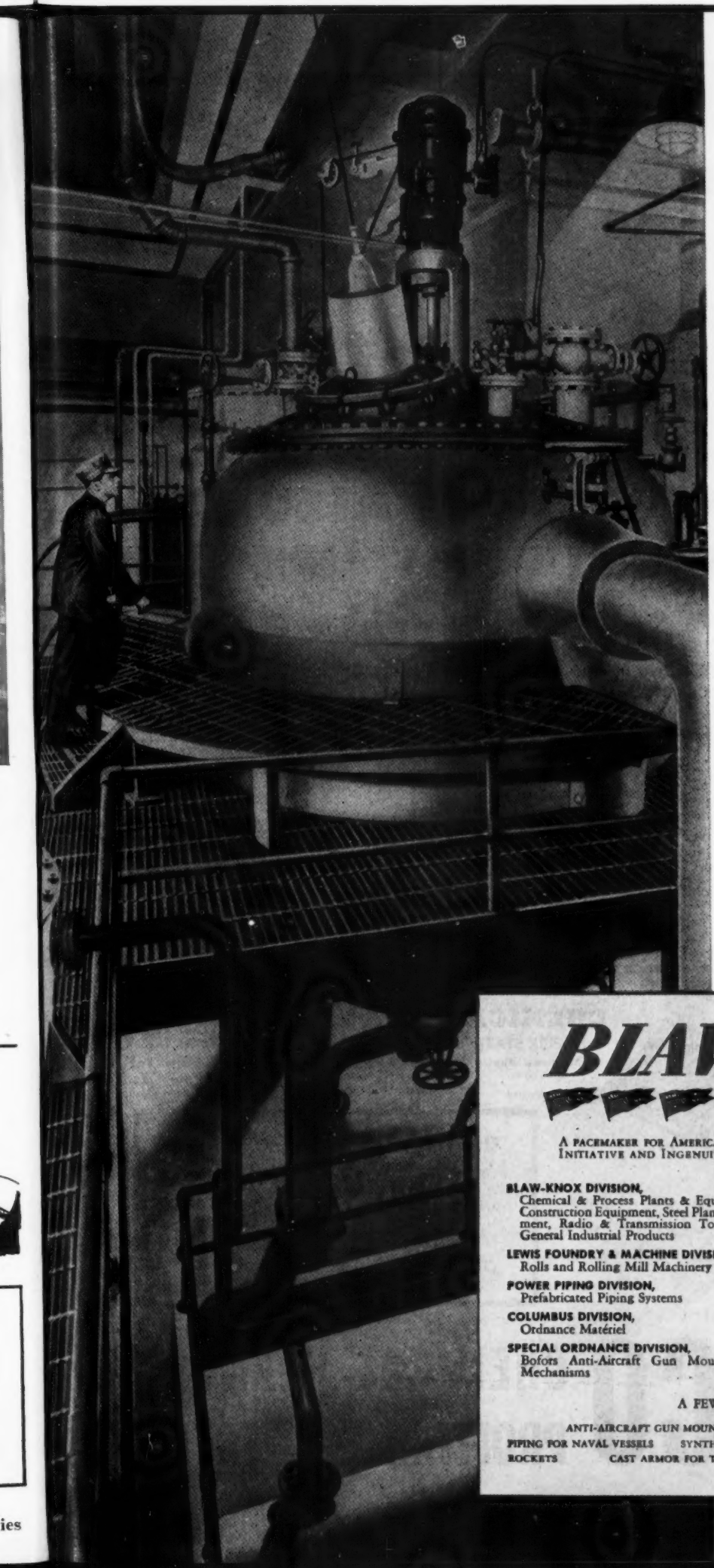

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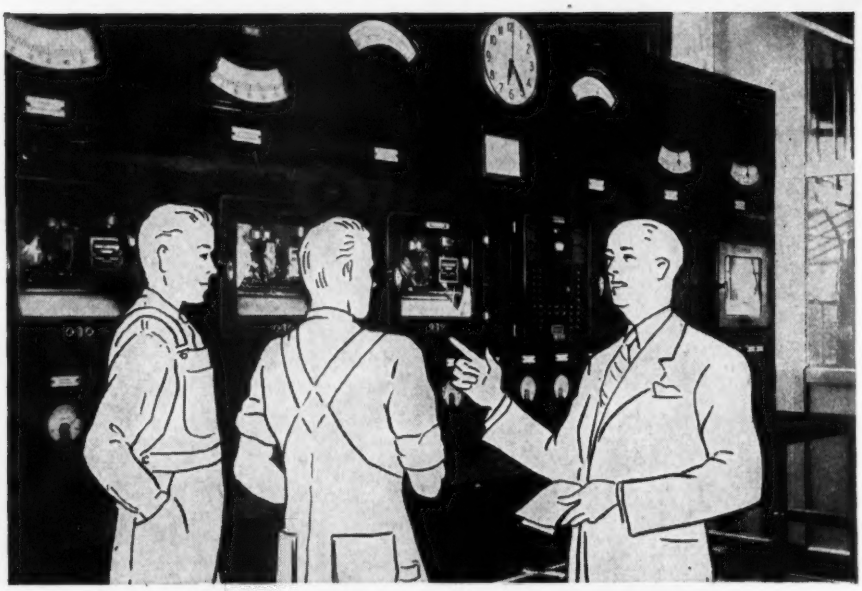
← *Designed and built in 1937 for Devoe and Raynolds Company, Inc.*



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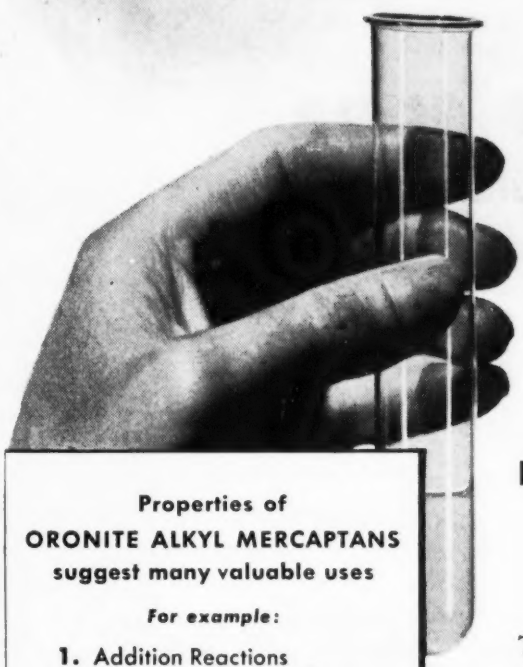

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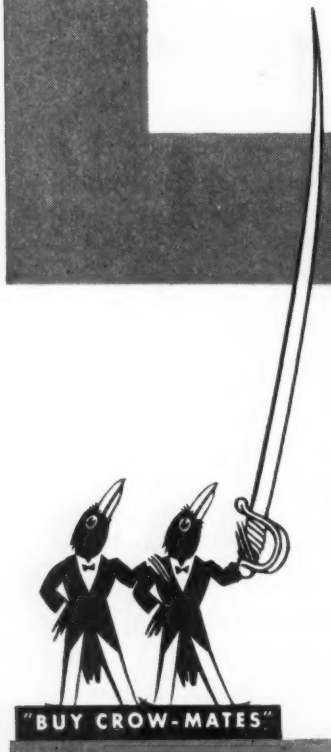

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Expansion Research

by ROBERT L. TAYLOR, editor

OUR LEAD ARTICLE THIS MONTH (page 949) introduces the term, "expansion research."

The name was coined by R. L. Davies and G. T. Collins, authors of the article, to describe a function which, while not new in the chemical industry, has developed into something considerably broader than indicated by such terms as "development," "market research," or "commercial research," under which it has been rather loosely classified in the past.

Expansion research, as defined by Davies and Collins, is the task of marshalling all of the facts—both technical and economic—upon which a company can base its decisions to enter new fields or introduce new products. It involves collection and evaluation of data not only on markets, but on processes, raw materials, distribution, and the competitive situation in general. The job is one which requires a high degree of technical knowledge and experience and a broad familiarity with all industry.

Some may wonder why we should be talking about expansion research now, with the chemical industry already so "overexpanded" for war that management is worrying about what it is going to do with excess employees and facilities when the real cutbacks begin. But that is why we are talking about it. Peculiarly, expansion in the chemical industry isn't expansion at all the biggest share of the time. It is simply the best known way of keeping from going backwards—meaning backwards actually and not merely relatively.

After chemical companies are through fighting the Japanese, they are going to be faced immediately with another fight against slipping back, a fight against obsolescence and declining markets—a fight that promises to be fully as tough for management as any it has experienced in seeing war orders through on schedule.

The chemical industry has always been noted for rapid change and a high rate of obsolescence among its products and processes. An acceleration of this pace in the postwar years is certain. Wartime accumulations of technical knowledge are yet to be fully unleashed outside of war projects, and when they are, some old established methods and materials are bound to suffer. New producers seeking to maintain their wartime share of the markets will vie with old producers trying to regain former peacetime positions. There will be many losers. Indeed that company which does not experience contraction or loss of market in at least one of its lines will be a rarity.

So it seems to us that the function of expansion research at this time takes on greater importance in the chemical industry than ever before. In fact, next to continued fulfillment of all war demands, there would seem to be nothing that should rate higher on present company programs.

Strictly chemical and engineering research, while they are the foundation on which expansion research is built, are not in themselves sufficient. Wartime ways of doing business must not be allowed to obscure the fact that in peacetime new products must be *sold*. They must be sound economically as well as functionally, and they must have a market. Somebody must want the laboratory brainchild—or be made to want it—at a price that includes a margin of profit, before it can do either its creator or society any good. It is the function of expansion research to evaluate new products from this overall standpoint, as well as to indicate lines of expansion opportunity that exist if the proper product can be developed.

The manner in which expansion research is fitted into the company organization does not seem to be particularly important. All of the larger companies already have some provision for it, although it is handled in several different ways under several different names. It can be made just one of the jobs of an overworked president, or it can be delegated to a ten-man department. The important thing is to find a person who is qualified and then see that he does it.

The pitfalls in anything relating to expansion are of course many. Expansion research is not an exact science like its chemical counterpart. It involves guesses and assumptions. It is sometimes thrown completely off when somebody else comes along with the same idea after the decision to proceed has been made. We presume it can be rather nerve-wracking and discouraging at times to the people who do it. But it is far more profitable than expansion without research, and in the chemical industry it is usually more profitable than no expansion at all. A comparison of some of the companies who do it with those who don't is sufficient evidence of that.

If expansion research was profitable for some chemical companies before the war, it is going to be almost a necessary insurance after the war. With the postwar competitive outlook as it is, expansion research promises to be as essential to sustained success in the chemical industry as production and sales themselves.

Cuban Alcohol

LAST MONTH IT WAS REPORTED IN CHEMICAL INDUSTRIES (page 795) that Cuba now has rated capacity sufficient to produce over two-thirds of the normal prewar ethyl alcohol requirements of the United States. Some industrial users of alcohol have interpreted this to mean an increased flow of Cuban alcohol into the U. S. after the war as compared with prewar, or a decrease in amount of Cuban molasses that will be available to alcohol producers in this country, or both. Actually, however, a consideration of all of the factors involved does not seem to bear out either conclusion.

As long as imported alcohol is at a 12 cents per gallon tariff disadvantage in this country, and as long as we are able to make alcohol synthetically from ethylene, it is difficult to see how Cuban alcohol could find a postwar market here.

And with the U. S. ruled out as a market, there will be little opportunity for Cuba to sell much more alcohol than she did before the war. Her own domestic consumption could be increased only by upping further, by legislation, the alcohol content of the present Cuban national motor fuel blend of 75 per cent alcohol and 25 per cent gasoline. But this would take only a small part of what could be made available from present capacity.

So, distillery capacity or not, there still seems but one thing the Cubans will be able to do with their molasses after the war, and that is sell it to the United States, as they always have.

An Untapped Resource

A FAVORITE SUBJECT OF DISCUSSION currently is the place that such valuable and highly advertised war developments as radar, jet propulsion, DDT, and penicillin will occupy in the postwar civilian economy. There can be no question of the future importance of these things, but it is obvious to those familiar with research methods that there must have been many unsuccessful trials in order to obtain these successful results.

The very concern which is being shown about the problems of reconversion is in itself evidence that war problems and peace problems are dissimilar. This dissimilarity offers the possibility that unused data from war research may serve for the devlopment of new products and processes for civilian use.

It is, of course, too much to expect to find a completely developed product or process among the leftovers. But it is entirely possible that buried somewhere in the pages of the war research reports are several ideas, well past the embryonic stage, that could find valuable application in peacetime industry.

Cast Thy Bread . . .

RECENTLY A EUROPEAN SCIENTIST was attending a technical meeting in this country where part of the program consisted of a symposium on a certain subject. Several papers were presented by persons from competing companies. When speaker No. 2 was finished, speaker No. 1 got up and asked some rather direct questions. The questions were answered as directly as they were put. Similar discussion occurred at other points in the meeting.

The European was amazed. "It is marvelous," he said, "how you Americans share your scientific knowledge. In Europe we would never think of asking such questions in front of an audience, much less receive answers to them. Things you discussed openly here today are jealously-guarded secrets in my country. Perhaps that is why you are so far ahead of us in applying your knowledge."

Perhaps it is. And perhaps we could be even further ahead than we are without hurting anyone. It is worth considering.

Salary Inequities Should Go

THE JUNIOR CHEMICAL ENGINEERS OF NEW YORK recently completed a salary survey covering 71 members whose years in industry range from 1 to 10. Surprisingly, those members who graduated from college in the recession years of 1938 and 1939 still average lower in salary—after seven years—than those who graduated in 1940 and in some cases 1941. A similar situation is noted in the American Chemical Society's economic status survey made last year.

It is both unfair and unwise on the part of management to permit graduates who entered the industry in a depression year to be saddled with a salary handicap for as long as seven years. Certainly the 1938 and 1939 crops of graduates were not inferior to the 1940 and 1941 crops. In companies where such salary inequities exist, they should be corrected at once.

Patent Service

COMMENCING THIS MONTH, the United States Patent Office has announced that a "Register of Patents Available for Licensing" will be maintained in Washington for the inspection of the public, and lists of such patents will be published in the Official Gazette of the Patent Office.

The purpose of the service, in the words of the Office, is "to bring to the attention of the nation patented inventions under which the owners are willing to grant licenses on reasonable terms; it is hoped that such information will lead to greater employment opportunities in the reconversion period, as well as permit industry to become acquainted with what is being done in various fields."

This service should be of great value to the chemical industry, both as a convenient source of information on available processes and as an indication of the status of various patents. As a part of its regular monthly patent section, CHEMICAL INDUSTRIES from time to time will include a list of these available patents that may be of interest to chemical producers.

Hydrogenations to your order by Hooker

Hydrogenations are an important part of Hooker Electrochemical Company's activities. Many concerns are taking advantage of Hooker's facilities in this increasingly important process.

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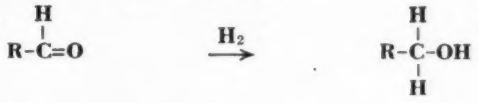
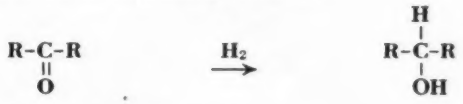
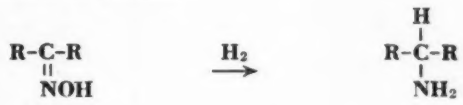


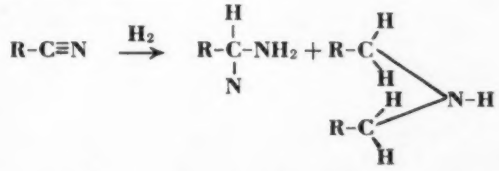
2. Ketones to Secondary Alcohols



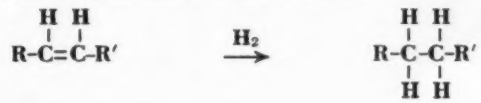
3. Oximes to Amines



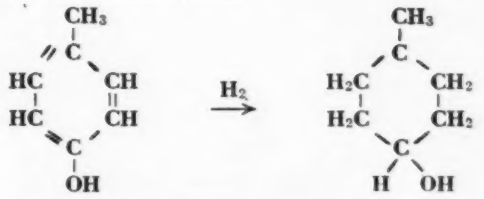
4. Nitriles to Amines



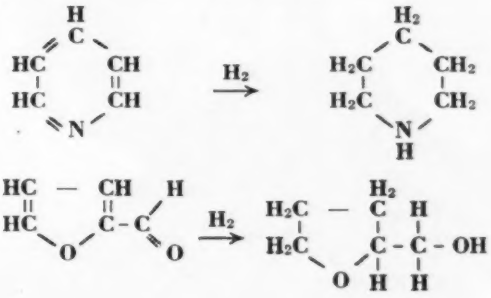
5. Aliphatic Unsaturates to Saturates



6. Aromatics to Alicyclics



7. Hydrogenation of Heterocyclics



8. Stabilization of Resins by Hydrogenation

9. Hydrogenated Castor Oil—Hooker's Hydrogenation Department is also producing hydrogenated castor oil. This product is being widely used as a wax substitute. It is a white solid with a melting range of 82° to 86°C.

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CHEMICAL OF THE MONTH

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DESCRIPTION: Chlorpropane Wax 130 is a tough white crystalline wax, possessing a mild camphor-like odor. It is a very highly chlorinated propane derivative and therefore nearly saturated. It is insoluble in water and soluble in alcohol, ether and most chlorinated solvents. It is resistant to oleum, mixed acids, fuming nitric acid and hydrogen fluoride. It is compatible with many types of plastics.

SUGGESTED USES: Plasticizer with urea formaldehyde, phenol formaldehyde, alkyd resin, vinyl polymer, polyvinyl chloride, methacrylate interpolymer and chlorinated rubber, forming tough or rubbery films; chemical resistant lubricant; organic syntheses to make synthetic rubber and plastics; ingredient of pyrotechnic compositions.

How ya' gonna keep up with a gang like that?

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Chemical Industries
JUNE, 1945

EXPANSION RESEARCH By the "Pattern System"

by RICHARD L. DAVIES and GEORGE T. COLLINS
Pennsylvania Salt Manufacturing Co., Philadelphia, Pa.

IN THE PAST, many attempts to set up systems of making expansion decisions have failed because of insistence that all the facts be available before the decision was made. The "pattern system", outlined here, recognizes at the outset that all decisions must be made with incomplete facts, but it provides a uniform way in which all available pertinent facts, as well as absence of pertinent facts, may be presented.

ALL industries from time to time are called upon to consider expanding their operations, by the addition of new products or by the substantial increase of production and sales of their present products.

In many industries such matters come up for decision only occasionally, so that the directors and chief executives of the company can themselves give attention to getting the extensive information which such important decision require.

Chemical companies are peculiar in that their products are continually becoming obsolete, and these companies can maintain their profitable operations only by constantly expanding to replace declining products.

The fact that a chemical company, as a result of this, is required to make expansion decisions almost daily, does not mean, however, that these decisions are any less important to the whole life of the company than the expansion decisions which other companies make only infrequently and with great care.

For this reason, most of the successful chemical companies have set up permanent facilities to assist the directors and chief executives in carrying out this important responsibility, by securing and presenting the detailed facts required for sound decisions. This fact-finding function is carried out in the different chemical companies by departments or divisions having various titles, such as Market Research, Commercial Research, or General Development. In all these activities, however, the point in common seems to be that, to be effective, these groups must report directly to top management, which holds the ultimate responsibility for the company's future and which therefore must make the expansion decisions.

TYPES OF DECISIONS

When an expansion decision is made, it generally falls in one of the following general classifications:

I. To do nothing further.
II. To get more information—via market studies, laboratory research, engineering studies, etc.
III. To undertake exploratory operations—such as through pilot plant work, market development, etc.
IV. To undertake commercial operations—by acquiring raw material sources, constructing or purchasing manufacturing facilities, setting up distribution organizations, etc.

The facts upon which these decisions are based can be arranged logically in two categories:

1. The Present Situation—or the objective picture as it exists assuming no action is taken by the company.
2. The Opportunities for the Company, if it proceeds.

The facts presented in each category can further be classified under the following headings:

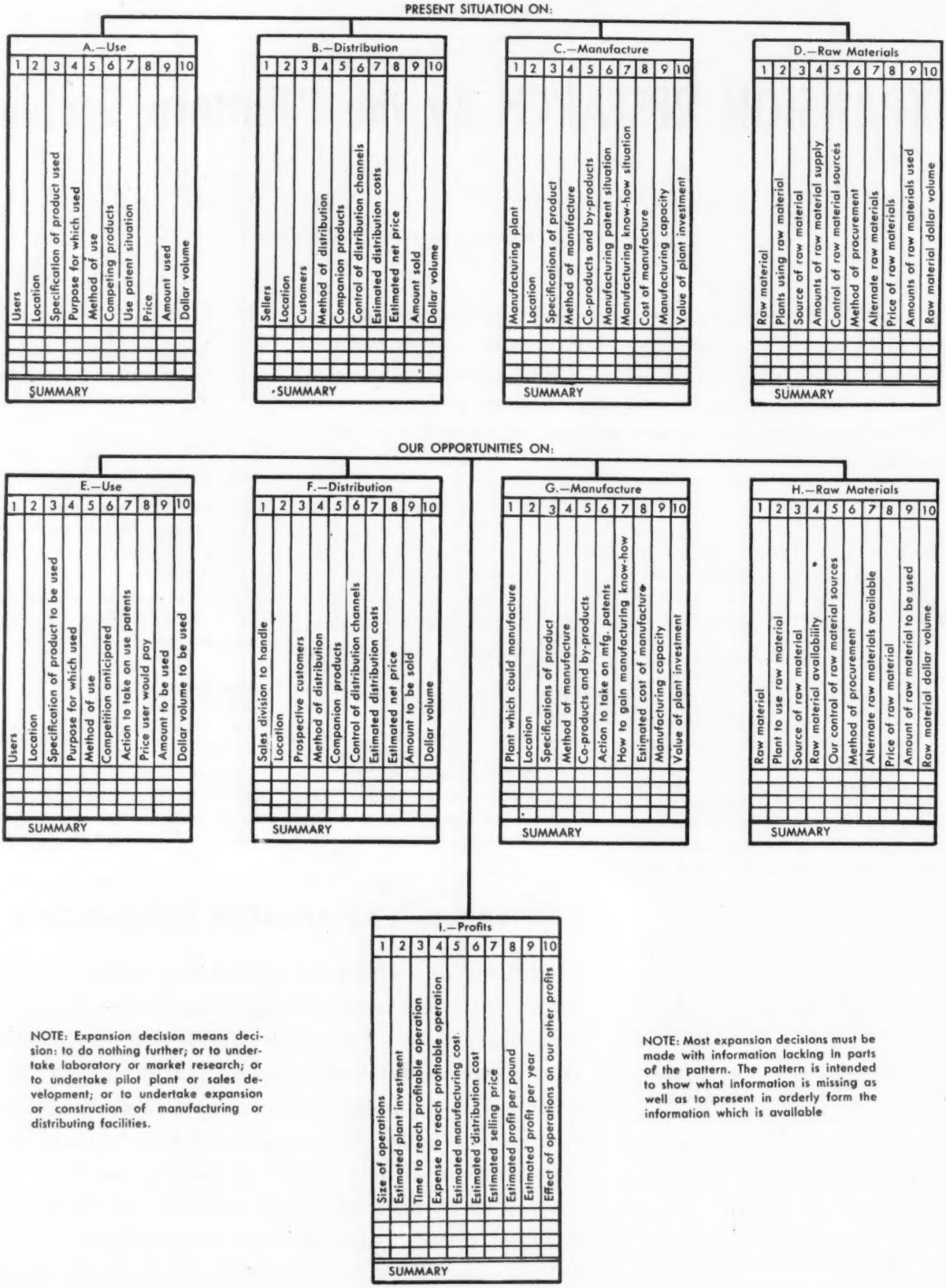
Use
Distribution
Manufacture
Raw Materials
Profits

This pattern provides a means of classifying all pertinent facts available at the time the expansion decision must be made. In the past, many attempts to set up sys-

WHAT IS EXPANSION RESEARCH?

CHEMICAL COMPANIES are peculiar in that their products and processes are continually becoming obsolete. Profitable operations can be maintained only by constant expansion to replace declining products. The term "Expansion Research" is suggested by the authors to designate the function of providing top management with data and recommendations — about markets, processes, raw materials, etc.—on which these expansion decisions can be based. The term seems to describe more accurately a function which heretofore has been variously classified as Market Research, Commercial Research, Development, or Management Service.—Editor.

FIGURE 1—PATTERN FOR ARRANGING INFORMATION FOR MAKING EXPANSION DECISIONS



NOTE: Expansion decision means decision: to do nothing further; or to undertake laboratory or market research; or to undertake pilot plant or sales development; or to undertake expansion or construction of manufacturing or distributing facilities.

NOTE: Most expansion decisions must be made with information lacking in parts of the pattern. The pattern is intended to show what information is missing as well as to present in orderly form the information which is available

tems of making expansion decisions failed because of an insistence that all the facts be available before the decision was made. The result of this frequently was that by the time all the facts were secured, the opportunity for expansion had changed or been lost altogether. Or, on the other hand, if the decision was made before all the facts were collected, it usually meant by-passing the system and making the decision on the basis of hunches and personal recommendations.

The "pattern system" which is outlined here recognizes at the outset that all decisions must be made with incomplete facts, but it provides a uniform way in which all available pertinent facts, as well as absence of facts, may be presented.

This system can be likened to a bank of "cubby-holes" in the wall facing the executive responsible for expansion. As he considers the various expansion opportunities, he knows to which "cubby-hole" to look for any particular type of information, and thus whenever an individual project is being considered, he can know immediately the important items of information which are there, as well as what facts are missing. His decision, therefore, can be made with due consideration of the risks involved in proceeding without these facts.

A pattern of this type which has been found very useful is shown in Figure 1.

Figure 1 is in miniature, for convenience in looking at the pattern as a whole. Actually, the small boxes shown represent places to put the individual items of information secured, and the "summary" boxes provide means of showing totals or generalizations based on these separate facts.

Explanations of the type of information to go under each heading is given below.

The way information is put into the pattern is shown in Figure 2, using the section, "Present Situation on Use" as an example.

The same procedure is followed for the other sections with boxes left vacant wherever information is not available.

The "summary" boxes for each section thus provide a convenient way of scanning the facts available so that one of the four types of expansion decisions described at the beginning of this article can be made quickly and intelligently.

CLASSIFICATION OF INFORMATION FOR MAKING EXPANSION DECISIONS

A. Present Situation on Use

1. **Users**—name of consumer or group of consumers using the product on which expansion decision is to be made.
2. **Location**—where this consumer or group of consumers is.
3. **Specifications of Product Used**—as required by this consumer or group of consumers.
4. **Purpose for Which Used**—by this consumer or group of consumers.
5. **Method of Use**—by this consumer or group of consumers.
6. **Competing Products**—which this consumer or group might alternately use, with explanation.
7. **Use Patent Situation**—from viewpoint of this consumer or group.
8. **Price**—paid by this consumer or group, including available data on history and future trends.
9. **Amounts Used**—by this consumer or group, including available history and future trends.
10. **Dollar Volume**—used by this consumer or group—history and future trends.

B. Present Situation on Distribution

1. **Sellers**—name of primary supplier or group of primary suppliers.
2. **Location**—specifically or by area.
3. **Customers**—individual consumers or groups to which this supplier sells.
4. **Method of Distribution**—by this primary supplier.
5. **Companion Products**—furnished by this primary supplier to the same market.
6. **Control of Distribution Channels**—by this primary supplier.
7. **Estimated Distribution Costs** (Costs of direct selling, technical service, advertising discounts, commissions, paid freight, customs duties and sales overhead).
8. **Estimated Net Price**—realized by this primary supplier.
9. **Amount Sold**—by this supplier.
10. **Dollar Volume**—by this supplier.

C. Present Situation on Manufacture

1. **Manufacturing Plant**—specific name of plant, or group of plants.
2. **Location**—of this plant or group.
3. **Specifications of Product**—as made by this plant or group.
4. **Method of Manufacture**—at this plant or group.
5. **Co-products and by-products**—at this plant or group.
6. **Manufacturing Patent Situation**—from viewpoint of this plant or group.
7. **Manufacturing Know-how Situation**—from viewpoint of this plant or group.
8. **Cost of Manufacture**—estimated for this plant or group.
9. **Manufacturing Capacity**—estimated for this plant or group.
10. **Value of Plant Investment**—estimated for this plant or group.

D. Present Situation on Raw Materials

1. **Raw Material**—used for this product.
2. **Plants Using Raw Material & Location**—i.e. using this particular raw material.
3. **Source of Raw Material**—for this plant.
4. **Amount of Raw Material Supply**—of this raw material by this plant.
5. **Control of Raw Material Sources**—of this raw material by this plant.

(Continued on next page)

CLASSIFICATION OF INFORMATION FOR EXPANSION DECISIONS (Cont'd)

6. **Method of Procurement**—Whether this plant buys on open market, contract, etc.
7. **Alternate Raw Materials**—which this plant could use.
8. **Price of Raw Materials**—paid by this plant or group of plants.
9. **Amount of Raw Materials Used**—by this plant or group of plants.
10. **Dollar Volume of Raw Materials Used**—by this plant or group.

E. Opportunities in Use

1. **Users**—name of consumer or group of consumers who would use our product.
2. **Location**—of this consumer or group.
3. **Specifications of Product to Be Used**—by this consumer or group.
4. **Purpose for Which Used**—by this consumer or group.
5. **Method of Use**—by this consumer or group.
6. **Competition Anticipated**—in getting this consumer or group to use our product.
7. **Action to Take on Use Patents**—with respect to this consumer or group.
8. **Price User Would Pay**—for our product.
9. **Amount to Be Used**—by this consumer or group of consumers.
10. **Dollar Volume to Be Used**—of our product by this consumer or group of consumers.

F. Opportunities in Distribution

1. **Sales Division to Handle**—specifying each which would distribute product.
2. **Location**—of sales facilities.
3. **Prospective Customers**—to which this sales division would sell.
4. **Method of Distribution**—by this sales division.
5. **Companion Products**—of this sales division
6. **Control of Distribution Channels**—which we would have in this case.
7. **Estimated Distribution Costs** (Costs of direct selling, technical services, advertising, discounts, commissions, paid freight, customs duties and sales overhead).
8. **Estimated Net Price**—to be realized by this sales division.
9. **Amount to Be Sold**—by this sales division.
10. **Dollar Volume**—by this sales division.

G. Opportunities in Manufacture

1. **Plant Which Could Manufacture**—naming each possibility.
2. **Location**—for each.
3. **Specifications of Product**—to be made by us.
4. **Method of Manufacturing**—which we would use at this plant.
5. **Co-products and By-products**—we would have here.
6. **Action to take on Manufacturing Patents**—if we proceed here.
7. **How to Gain Manufacturing Know-how**—if we proceed here.
8. **Estimated Cost of Manufacture**—at this plant.
9. **Manufacturing Capacity**—at this plant.
10. **Value of Plant Investment**—at this plant.

H. Opportunities in Raw Materials

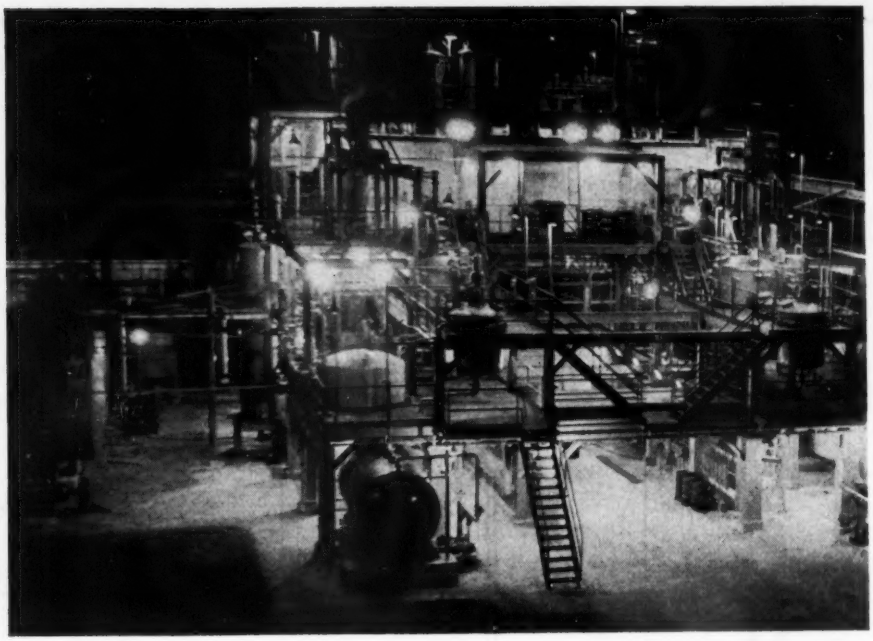
1. **Raw Material**—which we would use.
2. **Our Plant to Use Raw Material**—giving name and location.
3. **Source of Raw Material**—which we would use at this plant.
4. **Raw Material Availability**—to us.
5. **Our Control of Raw Material Sources**—on this raw material.
6. **Method of Procurement**—which we would use.
7. **Alternate Raw Materials Available**—to use here.
8. **Price of Raw Material Available**—to be paid by us, here.
9. **Amount of Raw Material to be used**—by us, here.
10. **Dollar Volume of Raw Material**—to be used by us, here.

I. Opportunities in Profits

1. **Size of Operations**—Specifying each size contemplated.
2. **Estimated Plant Investment**—for this size operation.
3. **Time to Reach Profitable Operation**—from now, for this size operation.
4. **Expense to Reach Profitable Operation**—from now, for this size operation.
5. **Estimated Manufacturing Cost**—per pound, for this size operation.
6. **Estimated Distribution Cost**—per pound for this size operation.
7. **Estimated Selling Price**—per pound, for this size operation.
8. **Estimated Profit per Pound**—for this size operation.
9. **Estimated Profit per Year**—for this size operation.
10. **Effect of Operations on Our Other Profits**—with this size operation.

FIGURE 2—PRESENT SITUATION ON USE OF PRODUCT "X"

USERS	LOCATION	SPECIFICATION OF PRODUCT USED	PURPOSE FOR WHICH USED	METHOD OF USE	COMPETING PRODUCTS	USE PATENT SITUATION	PRICE	AMOUNT USED	DOLLAR VOLUME
Acme Leather Corp.	Chicago, Ill.	X 90% Fe 1%	Softening leather	Soaking in 10% concentration solution 2 hours at 150°F	Product Y, but this is more difficult to handle	Clear	10¢ per lb.	100,000 # per yr.	$10,000 per yr.
Other leather companies	East and Middlewest	Same	Same	Same, but some use at 200°F.	Same	Clear	Same	160,000 # per yr.	$16,000 per yr.
Paint Industry	Principally in Middlewest	X 90% Fe .5%	Improving gloss	5-10% dissolved in vehicle	Product Z, which costs only 8¢ but gives less gloss	Controlled by Beta Corp.	12¢ per lb.	400,000 # per yr.	$48,000 per yr.
SUMMARY									
Leather & Paint Industries	East and Middlewest	X 90% Fe 1% for leather and .5% for paint	Softening leather and improving gloss in paint	Soaking leather and adding to paint vehicle	Product Y for leather and Product Z for paint	Clear on leather, controlled on paint	10¢ per lb. for leather grade 12¢ per lb. for paint grade	660,000 # per yr. (260,000 # leather grade and 400,000 # paint grade)	$74,000 per yr. ($26,000 leather grade and $48,000 paint grade)



51,000 tons of styrene a year can be produced in Monsanto's plant at Texas City, Texas.

WILL POLYSTYRENE nose out cellulose derivatives as the No. 1 low-price thermoplastic after the war, or will it revert to its prewar status of a medium-volume, medium-price material? The answer depends almost entirely on what the Government decides to do about synthetic rubber. Here are the possibilities as seen by the styrene producers themselves.

What Price Postwar Polystyrene?

EDITORIAL STAFF REPORT

THE GOVERNMENT synthetic rubber program and construction of large capacity for styrene production have had direct impact on the plastics industry.

Styrene is a relatively new raw material for plastics; the first polystyrene molding compound was introduced in this country in 1938. Although its acceptance was immediate and growth in its use rapid, the total of plastic materials from styrene was still relatively small in the last prewar years—approximately 9,500,000 lbs.

Styrene and its plastics derivatives though were the subjects of intensive research, and when the rubber program was initiated the data accumulated by this research had immediate application in the design and construction of Government styrene plants for GRS. At the time of the rubber crisis there were plans by several companies for construction of additional productive capacity for styrene to meet the growing plastics requirements. These plans of course were greatly surpassed by the Government GRS program. The capacity subsequently constructed was overwhelmingly greater than what would have been justified by the demands of the plastics industry. It is apparent therefore that the existence of this very large capacity is of great importance to those concerned with the utilization of styrene in plastics.

Indeed the effects have already been noticeable. Partly as a direct result, the price of polystyrene has dropped to less than 50% of prewar levels; research on styrene derivatives has been greatly reemphasized and much postwar planning revolves around the styrene materials. The price change is not due entirely to the construction of new styrene capacity because in 1942 much of the original development and research costs had been written off and the increase in demands for polystyrene made possible the utilization of more economical processes.

The research work carried out on styrene derivatives other than polystyrene molding compounds has been highly fruitful to date. A number of copolymers in which styrene is a prime constituent have been announced and appear to broaden the field considerably. Styrene monomer is a reactant to formulations of so-called low pressure or impression molding resins, and chemical modifications of polystyrene involving polymerization of chlorinated styrene have made their appearance. Rubber-like materials including styrene-butadiene copolymers of high styrene content are in use as plastics and a range of materials intended for other applications including casting sealants and pressure sensitive adhesives are coming from the laboratories.

The injection molding industry looks to polystyrene as its standard general-purpose thermoplastic molding material in the postwar period. Materials costs on this compound are now far lower than any competitive material, and physical properties are such as to make it suitable for the majority of injection molding applications. The increased demand of injection molders for polystyrene will become effective about two years after construction of equipment for civilian production is authorized. This lag will occur because of the time necessary to construct new polymerization capacity and to construct and install new injection machines. Such capacity for polymerization and molding is past the planning stage in the industry and in many cases equipment is actually on order.

POSTWAR CONSUMPTION

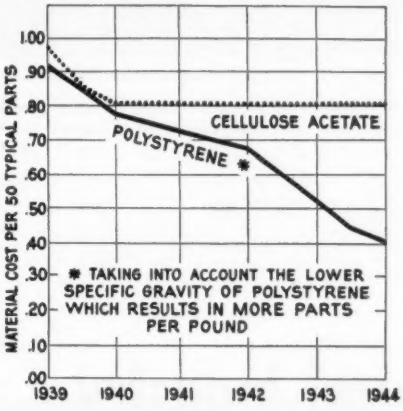
During the second year of full civilian production, it is estimated that only slightly less than 100,000,000 pounds of polystyrene alone will be consumed. This compares with a total of 150,000,000 pounds of other thermoplastic molding materials including cellulose derivatives, vinyls, acrylics and an indeterminable

The editors are indebted to Monsanto Chemical Co., Koppers Co., Inc., The Dow Chemical Co., and Union Carbide & Carbon Corp. for assistance in preparing this article. It is presented as a composite of the best knowledge and opinion of these four major producers of styrene for the Government rubber program. —Editor.

amount of styrene copolymers and modified styrenes.

These developments pre-suppose the availability, postwar, of low cost styrene in quantities far larger than were avail-

THERMOPLASTIC PRICE TRENDS



able prior to the GRS program. It is of interest therefore to consider the influence of our national rubber policy on the growth and development of styrene as a raw material for plastics and related applications.

It is apparent that styrene capacity over and above rubber requirements provides a supply far greater than anticipated plastics requirements, even if normal peacetime consumption of rubber is substantially increased and if there is no importation of plantation rubber. We are now making rubber at a rate over one million tons per year. Greatest consumption in any peace-time year was 660,000 tons. There is, indeed, more styrene capacity available now than required to supply the plus million ton rubber production, and styrene plants have been utilized on occasion for the production of ethyl benzene for the high octane gasoline program. This unbalance in favor of styrene over butadiene arises from two factors. The percentage of styrene required in much GRS production is said to be somewhat lower than anticipated at the time the plants were planned. In addition, some of the styrene plants have come into production at higher than rated capacity; as much as 50% higher under favorable conditions, according to one producer.

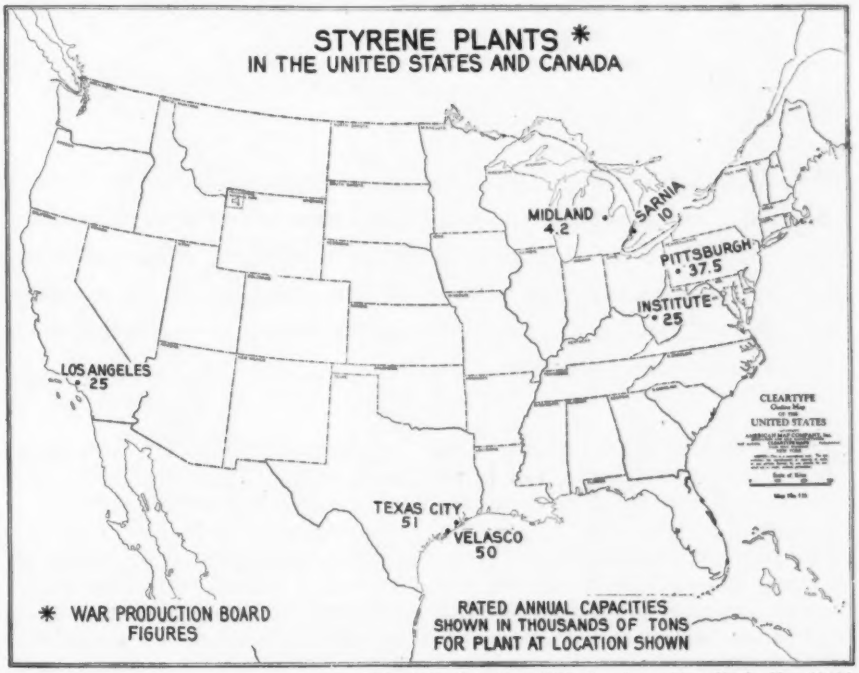
SEVERAL POSSIBILITIES

There are several courses open to those who will determine a postwar rubber policy. Taking an extreme case, we can shut down all synthetic rubber facilities and revert to the use entirely of plantation rubber, with the exception of those applications where natural rubber does not supply required physical or chemical properties available in GRS. From an international standpoint there may be heavy pressure to do just that. It might be possible in such a case to designate one styrene plant to continue in operation to supply plastics. If this course were followed, one 50,000 ton plant could supply plastics requirements, but it probably would be two years before it were utilized to capacity. If more than one large styrene plant were offered for private operation, none could be operated economically even after full demand became effective.

This is evident from a consideration of the economics of operation of such large plants. Under private operation, or even under postwar government operation, capital charges would represent a large part of the cost of the product. This is true even if the plants are sold at half cost. Although these plants are comprised of several self-contained units which can be operated separately, costs do not decrease directly with lowered rate of production. Insurance, maintenance and similar charges must be paid regardless of the rate of production. Obsolescence is another cost that will be high, because of the rapid technological progress of the industry. Thus the fixed costs—interest, insurance, obsolescence—will continue regardless of volume of production and the variable costs such as labor and maintenance do not vary proportionally with production. It is noteworthy, too, that these fixed costs are not taken into account in arriving at present styrene costs. It is clear then that any plant will operate economically only at or near capacity.

Taking the opposite extreme case, we could plan to utilize only synthetic rubber, and although this would have very serious repercussions in rubber producing areas of the world, it is conceivable. In this case there would be a sufficient number of styrene plants operating at an economical level to supply styrene at low cost and to supply it in sufficient quantity to take care of increasing requirements in the plastics industry.

The most likely policy will, of course, be continued operation of the GRS program at a reduced level side by side with importation of plantation rubber. The precise level at which the rubber industry is operated will have an important effect in determining the price and availability of styrene. If all plants are operated at a reduced level in order to keep them existent as operating entities it is likely that the cost of styrene will be considerably higher than the presently prevailing costs. This might be offset to some degree by continued Government subsidy of the synthetic rubber program. It is unlikely though that the subsidy would apply to styrene for plastics since in this case there is no special national policy involved. On the other hand if only a few plants are designated to be continued and these are operated either by the Government or by private owners at near capacity level, styrene monomer conceivably will be available on the market at approximately 10¢ a lb.



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Courtesy Westinghouse Electric Corp.

Ignitron rectifiers assembled in units of twelve tubes, deliver 5000 amperes each at 600 volts DC, and provide a continuous 24 hour flow of 60,000 amperes of direct current for the production of aluminum at the Aluminum Company of America, Vancouver, Washington, plant.

ELECTRONICS

Provides New Tools for Chemical Industry

EDITORIAL STAFF REPORT

THE WAR HAS BROUGHT spectacular developments in the field of electronics. Some of these have found application in extending older uses of electronic methods in the chemical field, while others are embodied in new devices still in the experimental stage. Among the latter are the microwave spectroscope, electron microanalyzer, and the process of chemical synthesis by ion bombardment of solids.

ELECTRONICS is already well established as a useful tool in the chemical industry. Electronic devices are being used for analytical work, for the control of process variables, for power conversion, as a means of supplying heat in such diversified fields as the dehydration of heat sensitive materials (penicillin) and the manufacture of plywood, and as a means of producing a more efficient source of light. There are still others that, as yet, have not emerged from the laboratory stage, such as chemical synthesis by the ion bombardment of solids and methods of analysis, micro-wave spectroscopy and the electron microanalyzer. The application of electronics in the chemical industry is still in its infancy. As remarked recently by A. W. Hull of the Research Laboratories of the General Electric Co., "Electron tubes are not inherently small; they are only very young."

MEASUREMENT AND ANALYSIS

A large number of the important applications of electronics in the chemical industry are of an analytical nature. A good example is the mass spectrometer. This instrument was developed primarily for use in the chemical and petroleum industries to enable the rapid and accurate analysis of complex mixtures of hydrocarbon vapors.

In the use of this tool, ions of the vapor are formed by the impact of an electron beam upon the molecules of the vapor.

The ions thus formed are accelerated through the two slits of the so-called electron gun by means of a slight potential difference between the slits. This narrowly collimated beam is then passed through the poles of an electromagnet whose magnetic field is perpendicular to the direction of motion of the ions. This perpendicular magnetic field produces a curvature in the ion beam as it accelerates through the spectrometer tube, the degree of curvature varying with the mass of the particular ion. By proper adjustment of the magnetic field only molecules of a given mass will find their way through the tube to the "collection plate" where they are gathered and measured. Heavier ions impinge on the outer wall of the tube while the lighter ions are gathered on the inner wall of the tube, both being drained to the ground and leaving only those of the correct weight to pass through the exit slit of the tube for measurement. The mass spectrometer, however, is only applicable when test samples can be made available in the gaseous state. Its applications are:

1. The tracing of stable isotopes.
2. Analysis for traces of gas in a mixture.
3. Analysis of extremely small quantities of a gas.
4. As a means of providing a continuous indication of changing composition of gases during a process operation.

The electron can also be used for the analysis of solids by means of electron diffraction spectra. In this procedure two main types of diffraction patterns can be obtained. These are:

1. Transmission patterns, which are obtained by passing an electron beam through thin samples of the material being studied.
2. Reflection patterns, obtained by impinging the electron beam at grazing angles.

Films for transmission studies in most cases must be prepared by the tedious method of evaporating on to organic films, making the reflection technique much more advantageous, as here the material need be satisfactory only in area and crystalline in nature.

The preceding analytical methods have been termed by J. Hillier of the RCA Laboratories as divisions of "electron optics." This term also includes the electron microscope, which is a tool that will allow vision at greater resolutions than can be obtained by means of the light microscope. Particles as small as single molecules with a molecular weight of 40,000 can be viewed. This instrument is a tool for observation only, as one can see the various parts of the body being studied but cannot tell the composition of these parts. The electron microanalyzer is a new instrument which is being developed in an attempt to provide microscopic observation as well as an indication of chemical composition. In this instrument the energy left in an electron after it has passed through a non-uniform film is measured to ascertain, by means of energy differentials, just what each part consists of. This instrument is still in a laboratory stage.

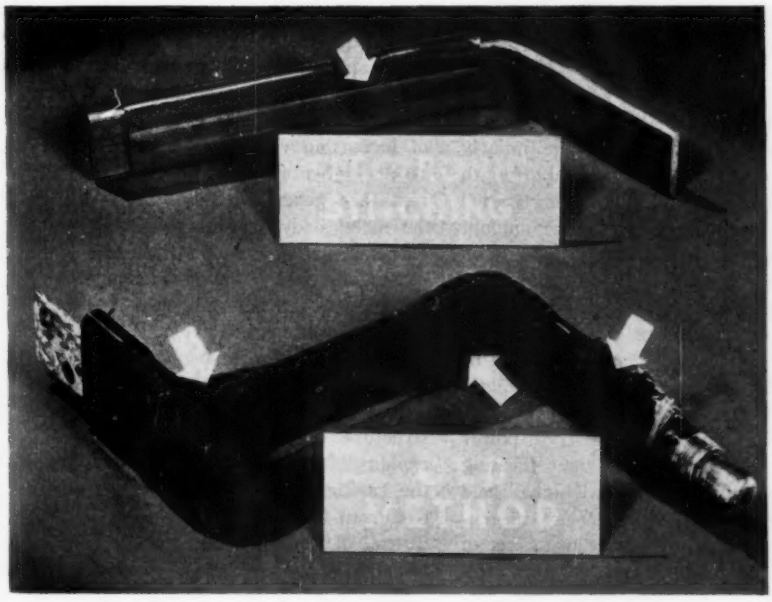
Another analytical tool which promises to be of value is microwave spectroscopy. According to W. D. Hershberger of the RCA Laboratories, this is absorption spectroscopy in the usual sense except that the illuminator is a generator of Hertzian waves rather than a source of visible light or infra-red radiation. The wave lengths utilized vary from one to thirty centimeters, and the use of the instrument is limited to gases that are heavy absorbers in this section of the spectrum. Dr. Hershberger noted that about one-third of the commercial gases are heavy absorbers, the others being intermediate to light absorbers. This development is still in its infancy.

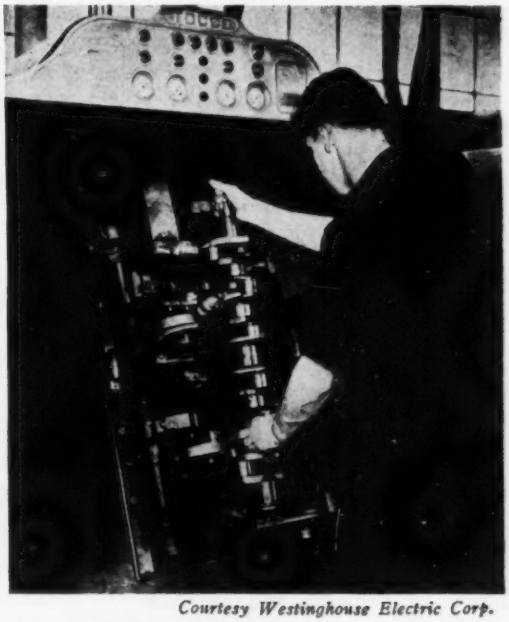
POWER CONVERSION

One of the earlier uses of electronics in the chemical industry was in the conversion of one form of energy to another, specifically in the conversion of alternating current to direct current by means of electronic mercury arc rectifiers and in the electronic conversion of electrical power to heat energy.

Most of the electronic mercury arc rectifiers are of the ignitron type which, according to J. A. Hutcheson of the Westinghouse Research Laboratories, have approximately half the loss of power possessed by former types. In the three year period from 1940 to 1943 the installation of rectifiers of this type, in terms of kilowatts of power, rose from 500,000 kw. to 2,500,000 kw. In the aluminum and magnesium programs alone, they are said to save an amount of power equivalent to that from a 60,000 kw. station.

As far as the chemical industry is concerned, power rectification in a sense is an indirect application of electronics as it merely transforms the power to a form in which it can be utilized rather than utilizing it directly. The electronic conversion of power to heat energy, however, as in





Courtesy Westinghouse Electric Corp.

At top left, insulation sealed on a copper bus bar by means of dielectric heating produces a much smoother job and requires only a few minutes instead of the hours required by convection ovens to produce the irregular coating shown at the lower left. At the right, in the hardening of crankshaft bearings with induction heat, hinged coils are placed over the bearing journals once the crankshaft is in place. The application of power requires only a matter of seconds and is followed by a water quench.

Courtesy Westinghouse Electric Corp.

This modern mass spectrometer requires about 15 kilowatts and operates on 110 volts, 60 cycle power supply. Uses of the mass spectrometer include: (a) tracing stable isotopes; (b) analyzing for traces of gas in a mixture. (c) making analyses where only a small sample of gas is available; (d) giving continuous indication of changing composition during a process. This front view shows the operating panel.

high frequency heating, is a direct use of electrical power. According to George H. Brown of the RCA Laboratories, high frequency heating, in spite of its many known uses, is still in its infancy, and present studies will point the way toward further use by the chemical industry.

There are two types of high frequency heating: dielectric heating and induction heating.

Dielectric or, as it is sometimes termed, electrostatic heating, utilizes frequencies from two million to fifty million cycles per second and is applicable only to those materials that are insulators or poor conductors. In operation the material being heated is placed between the plates of a condenser connected to terminals of a high-frequency generator. The plates of a condenser are formed by the top and bottom of the press and an electrode which is connected to the ungrounded terminal of a high-frequency oscillator.

The heat is produced via the intermolecular friction caused by the rapidly changing electrical field. As this phenomenon is molecular in nature, uniform heating throughout the mass can be assured if the material is molecularly homogeneous, if the electric field strength is uniform, and if the body being heated has the proper dimensions. The amount of heat generated in the body depends on the amount and time of the forced motion, an increase in frequency producing an increase in temperature of the body. An increase in temperature can also be achieved by an increase in field strength.

From the above it would seem that, barring the question of cost of power generation, the most efficient heating would result from the use of higher field strengths and higher frequencies. In general this is true, but the dimensions of the body being heated are of the greatest importance, as for large areas the currents involved may reach a magnitude that is difficult to handle. Improper length of the load may also produce standing waves with resultant uneven heating, particularly at the higher frequencies. Another limitation is the practical difficulty of generator design for high power at high frequencies.

In addition to the dehydration of penicillin and the manufacture of plywood, already mentioned, this type of heating has been used in drying rayon fibers, drying of glue, curing of resins, in the so-called RF sewing machine for the bonding of plastic sheets, and in the vulcanization of rubber and other plastic materials. It is understood that, as a postwar project, one of the large rayon companies is planning to convert all of its spinning lines to the use of dielectric heating for a drying operation. Other suggested applications include the drying of antitoxins, amino acids, sulfa drugs, and the pasteurization of milk and beer.

This method of heating is not cheap. According to Carl J. Madsen, Westinghouse Electric Corp., it costs approximately \$0.025 to \$0.040 per KWH, including direct operating cost, maintenance and amortization. Its usage becomes economic only by exploiting one or more of its unique properties, such as uniformity of heat generation throughout all parts of the mass.

Although not as directly applicable to the chemical industry as dielectric heating, induction heating is opening new fields through the use of higher frequencies. Induction heating differs from dielectric heating in that the heat is generated by means of eddy currents induced in a metal body by a rapidly changing electrical field, rather than by molecular friction. It can be used only for the heating of metal bodies, good conductors, and utilizes much lower frequencies than dielectric heating, usually ranging from 960 to 9,600 cycles, although frequencies as high as 450 kilocycles may be employed. Generation of power by electronic means, as by the electronic oscillator, becomes economic only when frequencies higher than 10 kilocycles are required.

These higher frequencies are becoming of increasing value to the steel industry as at higher frequencies the eddy currents are generated only in the skin of the metal body. This use of high frequencies enables the skin or surface to be heated so rapidly that large temperature differentials can be established in a metal body, permitting selective heat treatment of various parts of the metal, as in the hardening of the teeth of a gear wheel without disturbing the tough crystal structure of the central portion. The rapidity of the heating also makes possible the saving of much processing time, as treatment by this means requires seconds instead of the hours required by conventional means.

Reflowing of electrolytically deposited tin in the manufacture of tin plate is another example of the commercial use of high frequency induction heating. Frequencies of 100 to 450 kilocycles and

oscillators similar to those used in radio broadcasting are employed.

LIGHTING

Another electronic development of equally great importance to all industry is the fluorescent lamp, which, according to H. E. Dralle of the Westinghouse Electric Corp., gives more than twice the light for the same power input, as the incandescent lamp. This development has been of the utmost importance during the war as it avoided using critical materials in the form of new electrical connections when it became necessary to expand plants for war purposes. The amount of light that could be produced from a given lead could be doubled by use of fluorescent lamps without increasing the size of the lead.

In operation a fluorescent lamp consists of a tube containing mercury vapor under such conditions that it emits ultra-violet radiation, principally of a wave length of 2537A. This radiation, upon striking the fluorescent powder, magnesium silicate, coating the inside of the tube, is absorbed and its energy re-radiated in the visible region of the spectrum.

In addition to the effect produced on the chemical industry by the use of a more efficient source of light, fluorescent lighting also posed a chemical problem, that of preparing a sufficiently pure fluorescent powder. According to H. W. Leverenz of the RCA Laboratories, the presence of as little as one part of impurity in 100 million parts of fluorescent powders of certain shades is sufficient to produce an offshade. As an indication of the important place that this type of lighting now occupies, Mr. Leverenz further noted that over 100 tons per year of fluorescent powder is required for the fabrication of fluorescent lamps.

MISCELLANEOUS USES

The early stages of another interesting development have been described by L. P. Smith of the RCA Laboratories. This is the synthesis, by means of ion bombardment, of solids which will exhibit certain desired electrical properties. In most cases this bombardment is for the purpose of distorting the regular crystal alignment in order to produce the desired properties. Only the beginning steps have been taken in this development.

Electronic tubes and principles are also being utilized by the chemical industry for the control of flow rates, temperature and other process variables. In one type of controller an electronic circuit is utilized to operate a relay of the contact type. In this circuit a high frequency oscillating current is utilized to energize two small coils which are positioned in such a manner that when a small metallic disk, attached to the indicator, can pass between the coils. As the presence of this disk between the coils changes the inductance of the system, a method is furnished for producing a change in the amount of current flowing. This change in the amount of current passing through the system is used to operate a relay in the control circuit. No mechanically operated linkages and no auxiliary motor drive is required.

In another type of electronically operated controller electronic tubes have been used to provide an inductive rather than a rheostat resistance to supply the current variation necessary to operate the control devices in the bridge type of throttling controller.

The above-noted uses by no means exhausts the uses of electronics by the chemical industry, which is constantly expanding its application of these principles and devices.

ACKNOWLEDGMENTS

The above information has been gathered from many different sources, including the symposium on "Present and Potential Applications of Electronics to the Chemical Industry," presented by members of the staff of the RCA Laboratories at a meeting of the American Section of the Society of Chemical Industry on April 20; a paper presented by H. E. Dralle of the Westinghouse Electric Corp. before the Industrial Development and Electrochemical Conference, Chicago, Illinois; a paper presented by J. A. Hutcheson of the Westinghouse Electric Corp. before the National Chemical Exposition, Chicago, Illinois; a paper by Carl J. Madsen of the Westinghouse Electric Corp., and a talk by Dr. George H. Brown of the RCA Laboratories before the Radio Club of America at Columbia University on April 12.

Charles W. Leguillon (left) and William Jenkins of B. F. Goodrich Co. are shown operating the new electronic vulcanizing apparatus which greatly accelerates this hitherto slow process. The same uniform heating, so valuable here, is also useful in the molding of thick plastic parts.

Opportunities for Technology in India

by VAMAN R. KOKATNUR; Chemical Consultant

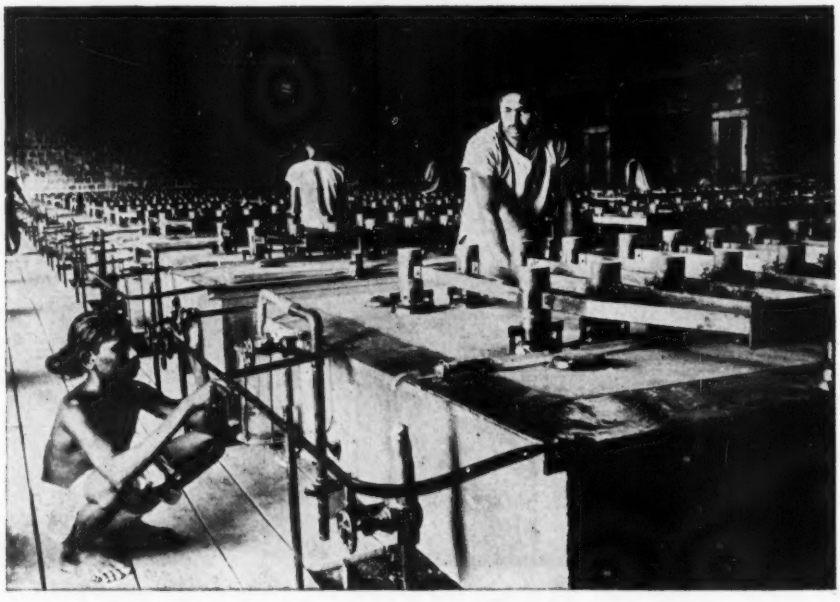
INDIA IS A LAND OF VAST AND DIVERSE NATURAL RESOURCES which are waiting to be developed. Moreover, she has the capital necessary to finance their exploitation. The author, an American-educated chemical consultant, has an intimate knowledge of his native country's needs and capabilities, and the opportunities offered there for American technological skill.

ALL UNDEVELOPED or partially developed countries offer an inviting field for technology. Technology, however, does not accept every invitation so offered, and as a result some countries remain undeveloped seemingly forever. Although the law of liquid flow is applicable to technology as well as to capital, nevertheless certain conditions must be fulfilled before such flow commences. Let us see what these conditions are and whether India meets these requirements:

The prerequisites necessary for the flow of technology into a country are a domestic market, suitable geographical location, natural resources for power and industries, cheap transport facilities—both internal and external, liquid financial resources, national stability, and compatible political ideology. The flow of technology is directly proportional to the algebraic sum of the prerequisites in one and the technological pressure in the other of the two countries.

In the decade immediately following the end of the war there will be only two technologically and industrially advanced countries capable of exporting manufactured products and services on one side and the rest of the world ready to import them on the other. The countries that figured in export during the prewar days both from Europe and Asia, such as Germany, France, Italy, Belgium, Holland, Czechoslovakia, Austria, and Japan will have been crippled in manpower, plant, and finance. Their recovery will be a matter of at least ten if not fifteen years. They will be out of the picture, then, so far as export is concerned. The two countries in the first category are England and the United States.

England, however, has suffered reverses because of bombings and having borne the brunt of war in Europe. The only creditor nation in World War I days, and sharing that category with the United States up to the present war, she will have to relinquish her position as a creditor nation at the end of this war. Destruction by bombing will necessitate a certain proportion of technological and productive power for domestic reconstruction. Therefore her full productive power will not come into force for export purposes. Some British economists believe that she will require about five years to reach her prewar productive capacity. However this may be, Great Britain is about one-third as effective in manpower and one-half in per capita productive capacity as the United States. Thus her technological and productive ratio is not more than one-sixth of this country's, and it follows that the technological pressure here is at least six times greater.



This plant in southern India is producing large quantities of bleaching powder and caustic soda. These are the cells in which brine is electrolyzed to give the products.

INDIAN RESOURCES

Wthout doubt China, India, and Russia will probably receive greater attention than the rest of the world for industrialization. For one thing, these three constitute half the population of the world. Among these three India seems to have some advantages over the other two. She has about as large a domestic market as that of China, but is superior in natural resources, trained manpower, internal and external transport system, liquid financial resources and, above all, in developed industrial capacity. Fortunately, war has not devastated the Indian soil, and hence there has been no destruction of plant and property. Even in prewar days, India was second only to Japan, the most industrialized nation, in all Asia, Africa, and the near east of Europe. During this war India has been the chief supply arsenal of small arms, munitions, and other supplies to the Far Eastern and the Near-Eastern theaters of war.

Total sea-borne trade of India is of the order of over one billion dollars. Within 8 to 10 days' water route, India has a potential market of 600 million people to the east and about 250 million westward. It has the largest coast-line to area ratio of any large country. Hence it has cheaper transit routes for export in comparison with the United States, China or Russia. India has more actual gold than almost any country except our own and certainly more than China or Russia. Furthermore, India has become the second creditor nation along with the United States, a position anomalous and incompatible with her dominance by England. Yet, the seeming British tenacity to hold on to India insures her political and financial stability since, if she became a Dominion according to Cripps' or any other plan, she will still be a part of the "British Commonwealth of Nations." India's tradi-

tions and aspirations and her connection with England argue for a political ideology compatible with the democratic way of life. Moreover, Indian business methods, laws, and the English language are a heritage of India as much as they are of the United States. This is an advantage that no other country offers us, while at the same time it is a disadvantage to every country except England which wishes to compete in India.

India has plenty of coal of medium grade and some of high quality. It also has some oil and great potential resources for hydro-electric power. Bombay was one of the most electrified cities of the world even before the first world war. Even the railroads were completely electrified. India has a very high-grade iron ore, is the largest producer of manganese, chromite, magnesite, ilmenite, monazite, and bauxite, and has fairly large reserves of all metals except platinum, nickel, and cobalt. It also has salt, saltpeter, barites, beryl, sulphur, pyrites, copper, lead, and zinc. It has a virtual monopoly in manganese, ilmenite, monazite, mica, shellac, jute, myrabolans, sandal-wood oil, castor beans and cashew nuts. India is the largest producer of oil seeds and sugar cane. It is the second largest producer of cotton, rice, and legumes. In short, it is very favorably situated with regard to natural resources. Thus the algebraic sum of her industrial potential is much greater than that of many countries, not excluding China and Russia.

AMERICAN OPPORTUNITY

It has already been shown that the United States has a technological pressure at least six times that of England, the only other nation that has a capacity for export technology. Now it is a well-known law of hydrostatics that the flow of water in a common pipe is in direct proportion to the respective hydrostatic pressures of the connecting supply tanks: in a system of two supply tanks connected to a common pipe where the hydrostatic pressure of one is six times that of another, the flow from one will be six times that from the other. Thus this nation can supply to India at least six times more services and goods than can England, and in doing so she would be only fulfilling a well-known natural law. Conversely, any attempt on the part of England to hold her own in the export field, is likely to be futile. There need be no conflict between them in technological export, since it is physically impossible for England alone to supply all the needs of India. England's prewar export share in the Indian market was about 30 per cent, and the balance was shared by eight or nine other nations including the United States. As most of these others are totally disabled for export, this country should naturally inherit their share. The fact that England's export trade with India was declining decade after decade in the prewar days, when according to her own admission her political dominance of India was greater that that which can be expected in the postwar period, proves the improbability of her securing a larger share of export after the war. Besides she has to watch her step in the postwar period, if she wants to preserve her name in the family of nations, in view of her debtor position to India and signatory position to the Atlantic charter.

India's natural resources are scattered throughout the country.

INDUSTRIES

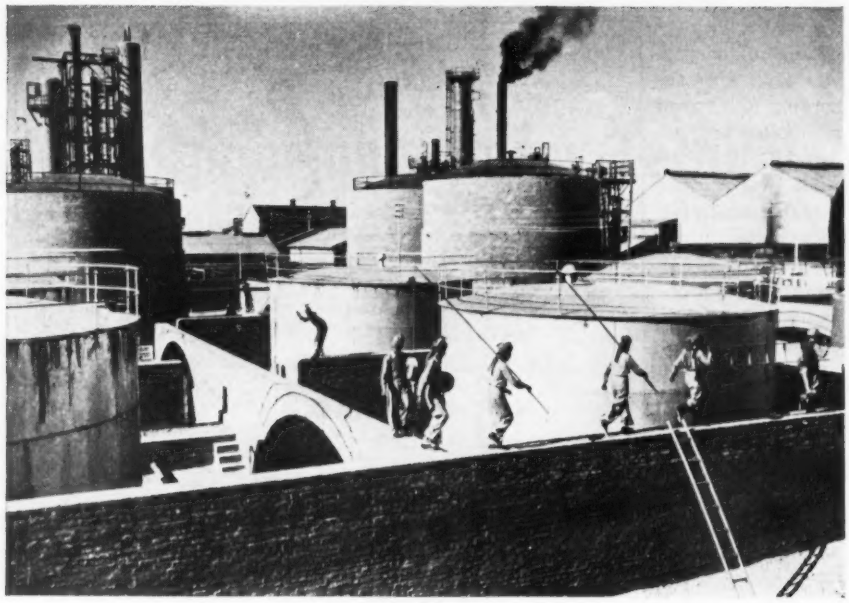
If Indian industrialization is to take place along the lines of her natural resources, India will have a coal tar industry and all its ramifications. This means she will require technological and engineering help in coal tar distillation, synthetic pharmaceutical products, dyestuffs, intermediates, insecticides like D. D. T., wetting agents, etc. India has the third largest textile industry, which requires sodium compounds, bleaches, sizes, sulphonated oils, alkalies, and mordants. Industries to produce these compounds are badly needed. There is a definite demand for a rayon industry since India used to import large quantities of rayon yarn from Japan although she has all the raw materials. She is in the market for at least six plants. India also grows natural silk, and has a fair sized woolen industry. The jute industry needs a technological revamping in certain of its phases. The shellac industry is quite primitive and in need of mechanization and technological improvements. She needs plants for grinding and extracting crude drugs, of which India exports more than 60 per cent of the world's total.

Of course the prime necessity is for fertilizers so that the food crops can be at least doubled. India does not produce enough food to support its 400 million inhabitants, but if she could double the food production, the situation would be considerably eased. This is entirely practicable if fertilizers are used in agriculture. At present no fertilizers are used in India. American engineers are at present engaged in building an ammonium sulfate plant in Travancore, but at least a dozen more plants are needed in the immediate future. If any fertilizer could be produced with a capital of half a million dollars or less, there would be a demand for a hundred or more plants. Rice and legumes are the staples in India, and hence cheap nitrogenous fertilizers are in greater demand.

PAPER

In spite of low literacy, India has a great demand for printing paper; she is about the third largest printer in the world. Although she has a fair sized paper industry, there is room for at least one hundred thousand more tons of paper capacity. The large part of Indian paper is produced from imported pulp, and while there are no large resources for wood pulp, there are very large resources of bamboo, cane-bagasse, corn, and other stalks that can be used for raw material besides various grasses and reeds. Since India requires rayon plants in addition to various types of paper, it is essential that some other raw material other than wood should be utilized as a source of cellulose. There is room for a printing ink industry. India has the second largest motion picture industry and is in need of a plant to manufacture films.

India uses an enormous amount of glass although not all of it is industrial glass. All Indian women except widows wear on both wrists a dozen or more colored fancy bangles that serve as bracelets. Most of these have been imported heretofore from Austria, but since India



Process tanks of an Indian oil refinery. Firemen are exercising in the foreground.

makes industrial glass, she would like to make these bangles, too. Women of higher economical levels have begun to use bangles from plastics, and industrialists are actually thinking of some suitable plastic plant. Since benzol and formaldehyde are both being produced in India today, a synthetic phenol plastic plant is entirely feasible.

India and Ceylon together produce about 5 per cent of the world's natural rubber. Dunlop and Firestone have already started factories to manufacture tires in India. Indian capital is looking forward to another factory to manufacture various goods and toys from rubber as well as latex. She is also the largest producer of various types of oil seeds in the world and has a virtual monopoly of castor beans. Therefore there is need of oil-crushing and solvent extraction plants to produce cooking oils, salad oils, shortening compounds, paints, varnishes, and lubricants. Hydrogenated peanut oil is in great demand for shortening and as a substitute for butter, which is not much used in India because of its perishable nature in the Indian climate. In spite of the fact that Lever Bros. has two plants in India, there is a definite need for about half a dozen small soap factories with facilities for recovery of glycerin.

As the largest cane sugar producer, India has a large amount of molasses, making possible many alcohol and yeast plants. There is a ready market for alcohol for power purposes and for the extraction of drugs, but the market for yeast has to be developed. The protein deficiency creates a need for yeast, both as a food and as a vitamin supplier—particularly because a large majority of the people is averse to the use of animal protein. Similarly there is a demand for dairy plants and an especially large demand for both fruit and vegetable canneries. There is a small requirement for plants to make cereals, macaroni and vermicelli. India already manufactures, in cottage industries, a very large amount of puffed rice, popped corn, and rice-flakes. India is the largest producer and drinker of tea in the world. At least one or two biscuit and cracker plants would be quite profitable as adjuncts to tea drinking.

RESEARCH

It is reported that India is buying several small caustic soda and chlorine plants at the present moment. There is also an immediate market for a large quantity of scientific apparatus for a hundred or more colleges and universities. India has shown aptitude in scientific research as attested to by about ten fellowships in Royal Society and a Nobel prize in physics and is about to establish a National Chemical Laboratory, to which end a scientific mission is visiting this country at present to see various research laboratories. There is immediate need of experienced teachers of chemical engineering in some of the schools.

India is the largest exporter of raw hides and there is a large domestic market for shoes and sandals. Indian leather industry, in spite of many attempts, has not been successful as yet. The difficulty seems to lie in proper engineering. Various tanning, curing, and dyeing raw materials are available in plentiful quantities. There is a large production of tobacco and some of very good quality, most of which has been exported; since India imports fairly large quantities of cigars and cigarettes, there is a real field for manufacture of these. Industrialists are looking for help from the United States in this venture. India also has very large resources of essential oils, particularly of wood, grass and spice oils. Sandal wood and its oil is a monopoly. Except for sandal-wood oil, no other oils are distilled, and India is looking forward to the development of this industry.

So far India has only one metal industry fairly developed. This is iron and steel and owes its existence to the American engineering service of the late Mr. C. P. Perrin. If India is to build automobiles and airplanes, it is essential that she have the ferro-alloys industry. Fortunately, all minerals except cobalt and nickel occur in India in sufficient quantities. Manganese, chromite, ilmenite, zircon, monazite, bauxite and magnesite are abundant. There is need of a pottery industry as India has very fine clay in abundant quantities. India imports considerable aluminum for fabrication of cooking utensils. Indian capital is looking to America for the establishment of this industry.

These are some of the industries that are considered of immediate need in the postwar period. India has resources for many other industries, but the ones mentioned are particularly suited to fill the immediate needs of its people.

Not all Indian industry is as modern as shown in the other illustrations. Here, with the crudest equipment, natives are washing lac preparatory to shellac manufacture.

Mobile Air Reduction Plants Provide Oxygen for War

THE AIR TECHNICAL SERVICE COMMAND is using mobile air reduction plants in the various war theaters to fill oxygen cylinders for high altitude flying. The largest one of these plants, nestled in the hold of a Liberty ship, is capable of turning out 59 pounds of liquid oxygen per hour.

GENERATION of oxygen by air reduction is one of the many complicated processes that have to be carried on wherever there are Air bases. It requires complex machinery, which can be moved as our bases advance. The largest mobile unit now in operation overseas rests securely in the hold of a Liberty ship, one of several converted into floating aircraft repair units by Air Technical Service Command, and used to back up B-29s in the drive against Japan.

Magnitude of the oxygen supply problem is seen when it is realized that it takes two and a half to three 220 cubic foot storage cylinders, under 2,000 psi. to service the tanks in one B-29 for one mission. Multiply this by a couple of hundred planes, and it's a lot of oxygen.

Capacity of the floating unit is three 220 cu. ft. cylinders per hour. The system incorporates a four stage compressor, a chemical scrubber for removing carbon dioxide, heat exchangers, a refrigerating unit, and a fractional distillation column.

Air is sucked into the compressor, where it is compressed to 150 psi. in the first two stages. Then it is injected into the scrubber, which consists of tanks lined with curved steel baffles. Air is let in at the bottom, and sodium hydroxide is sprayed down from the top. The S-shaped baffles create turbulence and insure thorough contact between the air and the sodium hydroxide. The carbon dioxide combines with the hydroxide, forming sodium carbonate, which has to be cleaned out of the scrubber after 34 hours of operation.

The air now returns to the compressor, is jacked up to 3,000 psi., and ducted to the air separator. The first heat exchanger lowers temperature to about 78 deg. F. Air passes through a silica gel desiccator and into a second heat exchanger, followed by cooling coils in a Freon (dichlorodifluoromethane) refrigerating unit, which doubles the plant's output by halving the time otherwise required to reduce the air to liquefaction temperature.

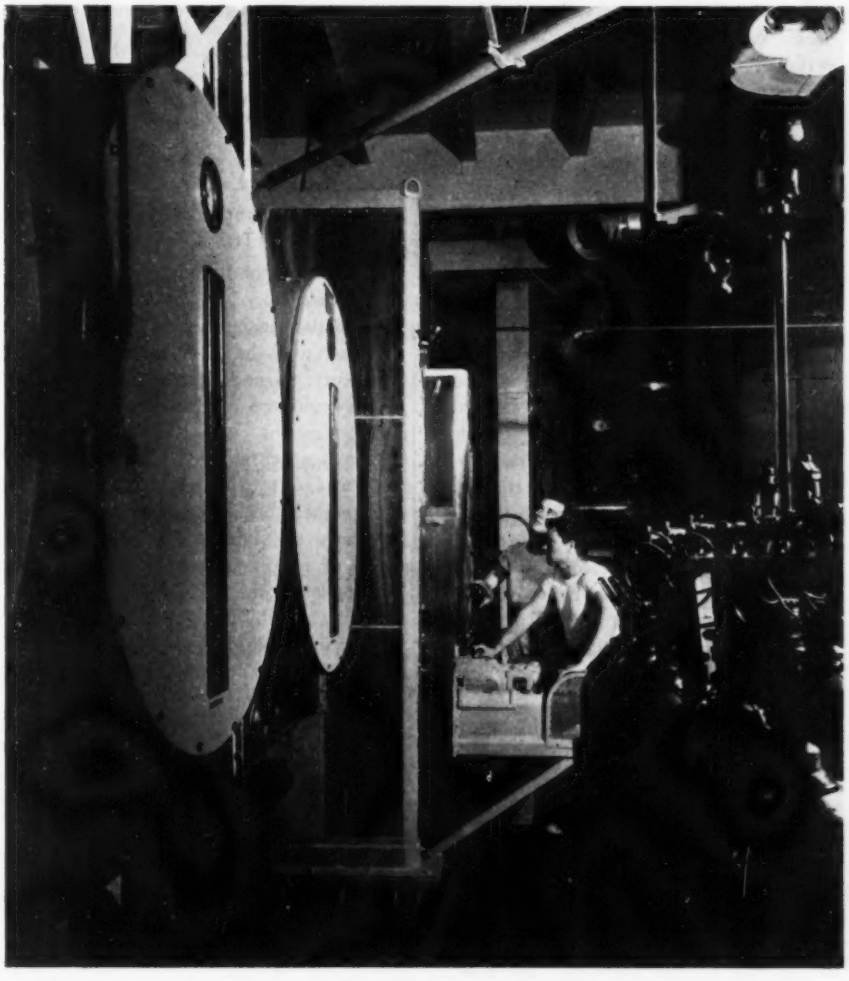
Leaving the cooling coils at —40 deg. F., the following two heat exchangers further cool the air down close to 321 deg. below zero, F., at which point air will liquefy. An expansion valve and reduction of pressure from 3,000 psi. to 9 psi. complete liquefaction, which is followed by fractional distillation in the column. Separation of nitrogen and oxygen takes place in a series of bubble caps, which allow oxygen to flow down to collectors at the bottom, and nitrogen to pass off at the top. The bubble caps are so constructed that their operation is not disturbed by heavy seas.

Both oxygen and nitrogen, at about 317 deg. below zero F. are piped back around the heat exchangers to cool incoming air from the compressor. The waste nitrogen is then heated to 470 deg. F. and forced through the silica gel to remove moisture, so that this chemical can be re-used. The oxygen, vaporized in the heat exchangers, is pumped into storage cylinders.

It is possible to transfer liquid oxygen into storage tanks, and thence into thermos jugs for transportation ashore. But the speed of evaporation, and the greatly increased risk of explosion, make this process only an emergency measure.

From a warm start (and it usually is in the tropics) the plant requires four hours to produce oxygen. Once the machinery is cooled, the system will produce in about two and one half hours. Power is supplied by electric motors, 75 hp being furnished the compressor, and 15 hp for the refrigerator. The plant was built for the Air Technical Service Command by Air Products, Inc., of Chattanooga, Tenn.

The floating depot is a new Air Technical Service Command development, which brings fourth echelon repair up front where it is needed to keep our biggest bombers in the air. The AAF operating personnel, called "sail-jers," were specially trained and selected for their duties by Air Technical Service Command, and are among the Air Forces' best in top flight mantenance work. The units are already credited with saving many valuable months in restoring B-29s to flying status, and the oxygen needs are among the many attendant problems.



Oxygen plant aboard a Liberty ship converted by the Air Technical Service Command into a sea-borne B-29 repair shop. At left are storage tanks for liquid oxygen, with gaseous oxygen cylinders at right. Operators are standing in front of liquid air still and liquid air pump.

Requirements of THE TECHNICAL MAN

CHEMISTS AND CHEMICAL ENGINEERS are sometimes called upon to present or interpret expert testimony in connection with patent cases, damage suits, and other types of litigation. Anyone undertaking such an assignment should be familiar with what are generally considered the basic requirements of a good expert witness. These are discussed here from the standpoints of both the lawyer and the technical man.

As Seen by the Lawyer

by FRANK E. BARROWS

Pennie, Davis, Marvin & Edmonds
New York, N. Y.

SINCE judges are not usually informed on technical matters, but yet must decide cases involving such matters, experts, or those specially qualified to give evidence on the technical matters involved, are relied upon to supply the necessary evidence to aid the judge in deciding the case.

F. E. Barrows

From the very nature of expert testimony dealing with technical matters, the expert should be one qualified by training and experience to deal with the technical matters involved, such as the meaning of technical terms, the state of the art and the prior knowledge of the art to which the invention relates, the relation of the invention of the patent in suit thereto and the relation of the alleged infringing device to the patented invention.

One Federal pudge, in discussing the use of experts, particularly in the field of patent law, said as follows: (Judge Yankwich, A.B.A. Journal, 26, 736, 739, Sept. 1940.)

"The expert who can be of the greatest assistance to the court is *the practicing scientist in the field.* The man who has made a life-study of the particular art or science and brings to the court the benefit of his research and study. This he can do by explaining in such fields as electricity, chemistry, physics, or other branches of knowledge, the principles to which the particular invention relates.

"His aid is greatest, perhaps, in correlating the particular invention to the field in which it is claimed to be either a primary invention or a patentable improvement or combination of old elements. I would formulate the following rules for achieving this result:

"He should confine himself strictly to facts.

"He should relate his facts to the particular field of knowledge in its whole perspective.

"Where necessary, he should make original experiments to support his conclusions.

"In patents of a mechanical nature, the showing of large models constructed scientifically according to the teachings of the patent and the observation and demonstration of their workings in open court are, perhaps, the most useful tests by which the expert can aid the court."

PREPARING THE CASE

While the handling of legal questions is the function of the attorney, a knowledge of the legal principles and questions involved may be important in enabling the expert to understand the significance of his evidence and its bearing on the legal questions.

In patent cases the ultimate questions for the Court to decide are validity and infringement but, since patents are purely creatures of statute, the relevant principles of patent laws have to be applied in considering the evidence by which these are determined. The invention to be patentable must be (1) new, (2) useful, and (3) involve invention. The presence of sufficient utility is rarely in controversy but the utility of the invention as shown by a comparison of it with what preceded it and by the extent of its use may be important. An invention is not novel in the sense of the patent law if it has been previously patented or described in any printed publication and inventions may be new in a commercial sense where they may not be new in the sense of the patent law because described in some prior patent or publication. An invention is not new if it has been previously used commercially. Even though an invention may be new, it may nevertheless be unpatentable because it does not involve the exercise of invention but rather the expected skill of those skilled in the art. In determining the validity of a patent, it is necessary to consider it in the light of the knowledge of the art and the nature of the advance, if any, which the invention makes in the art. In considering the alleged infringement, it may be necessary to compare this not only with the patent but also with the prior art.

Investigations of the prior art are commonly made by patent attorneys or by trained searchers through the prior patents and literature. Assuming the investigation has been complete, there remains a question of determining the bearing of the prior art on the patent from the standpoint of anticipation or lack of invention and of analysis of the case and preparation for trial. When the necessary preliminary investigation has been made there is need of studying and analyzing and digesting the available material to determine the nature and scope of the patented invention, the bearing of the prior art patents and publications and of knowledge in the art on the patented invention and whether the allaged infringement embodies the patented invention.

It is often necessary or desirable to carry out tests or experiments both in determining the bearing of prior art patents and publications and in preparation for demonstrations which may be desirable as a part of the evidence to be presented at the trial.

It is a part of this analysis and preparation for trial to study both sides of the case so that the expert and attorney may have as complete as possible a knowledge and understanding of the opponent's case as well as their own, thus minimizing the danger of surprise at the trial and enabling the attorney to be better prepared to cross-examine the opposing experts.

Just as consultants may have in their staff experts with special training and qualifications along different lines, so it sometimes happens that different experts may be consulted and may have special ability in the preliminary analytical and investigational work whereas the final presentation of the case at the trial may be left to an expert with special training and qualifications along that line.

TESTS

The Courts have frequently been critical of tests made by one party and presented for the first time at the trial and in some cases they have been held to have little

as an EXPERT WITNESS

or no weight as compared with *inter partes* tests where both sides are represented and have their full knowledge of them. Frequently, opposing experts disagree so widely in their evidence and in the tests which they have made that the Courts have been critical of such expert testimony.

Proposals have been made from time to time for the employment of so-called neutral experts by the Court but the experience in cases where this has been done has not been particularly satisfactory.

PRESENTING EVIDENCE

The expert who is to present evidence at the trial will have had the benefit of all of the preliminary consultations and investigations and before the trial will have worked out with the attorney the testimony to be given. The issues should have become crystallized so that the evidence can be concentrated on the particular points of importance. And a consideration and discussion of the opponent's side of the case would naturally be included in the preparation together with the expected cross-examination.

Since most judges are not especially informed on technical matters, they must rely to a large extent in many cases on the expert testimony presented. An ability to present technical matters in an understandable way so that the judge understands them is one important qualification of an expert witness. Ability to withstand cross-examination by opposing counsel is another important qualification; but the more completely the expert understands both sides of the case and the issues involved, the better prepared he should be for presenting the matter both as a part of his direct examination and on cross-examination.

VISUAL AIDS

Frequently, an understanding of the matter involved can be had better by the use of models or charts than by oral testimony without them. Sometimes demonstrations or experiments carried out in the Court at the trial are helpful in enabling the Court to see and understand what might otherwise be difficult. Any such demonstration should, of course, be carefully prepared and the expert should be fully prepared before cross-examination on them.

Where opinion evidence is given as a part of the testimony of an expert, there should be an ample and sound basis for the opinion expressed and the expert should be properly prepared for cross-examination as to the basis for such opinion evidence.

As Seen By the Technical Man

by B. T. BROOKS, Consultant
New York, N. Y.

MY OWN limited experience as an expert in court cases, most of them having to do with patent litigation, convinces me that, in general, such cases are carried on according to exceptionally high ethical standards. Most of the Federal judges before whom I have testified, or who have conducted other cases that I have studied, have been both understanding and patient in the consideration of technical matters. It does happen rarely that a judge is impatient with technical testimony to the point where his extreme impatience prevents the proper presentation of technical testimony. However, the attitude of most of them, I believe, is well expressed in the words of the Court in a patent case in which I took part:

B. T. Brooks

"In a chemical art so obscure and unpredictable as this one, where the catalytic and adsorptive effects and the mechanism of polymerization involved are imperfectly understood even today by the best experts, results cannot be forecast. They arise, not from theory or prediction, but from experiment and discovery. All information on controverted points must come to us through the testimony of expert witnesses. In the light of such a situation, we Judges, not specially trained, might just as well be frank in admitting that, in order to hope for a measurable degree of mastery of a case like this, we must simply go to school, as it were, from the time the case starts, or 'books are open.' To be frank again, in our struggle to master such a case with its myriad fine questions of patent law fully as many chemical problems, involving analysis after analysis, spun into almost infinite minutiae, we find ourselves groping for a dependable leadership among the experts on the witness stand."

THE LAWYERS

I think many chemists, perhaps, have the idea that lawyers are special pleaders to bring pressure to bear on expert witnesses to win the case "by hook or crook," and I have no doubt that since lawyers are just people, as chemical experts are also just people, that there are some lawyers who try patent cases whose ethical standards are not of the highest. However, such are not within my experience.

In one case, I was given all of the documents relating to the suit, was asked to study the matter for approximately a week, and was then asked to give my views of the suit without any disclosure by counsel in the case as to what their views were. They stated that they did not wish to influence me in any way at all before I had formed my own ideas of the case and more particularly what my own testimony would be. In this same case later on I mentioned that I thought I would have to admit certain things which seemed to me very unfavorable to our side of the case. Counsel's reply was, "Go ahead and admit it freely if the matter comes up . . . we think we can win this case with the truth and the more of it we have the better we like it!"

Patent cases from their very nature deal very largely with fact testimony and the orderly presentation of evidence and the methods of proof are exactly the same, just as logical and just as scientific in method as the methods of proof that we are supposed to employ in research and in scientific reasoning.

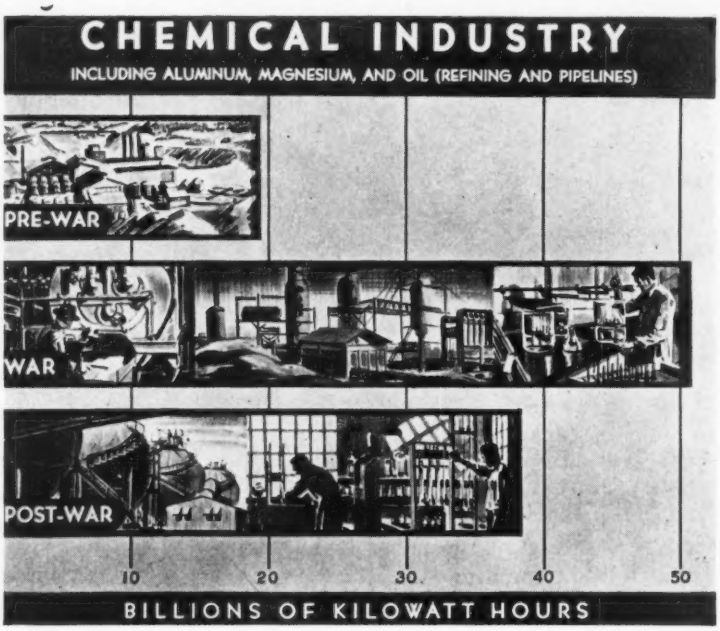
I have never been asked by any reputable attorney to stretch the truth or to give an opinion which was against my best judgment.

THE WITNESS

Probably everyone has heard the somewhat libelous designation of expert witnesses as the worst of the class among liars, damn liars and expert witnesses. Speaking only about my opponents in such suits, I am glad to say that I have never encountered one who I thought could properly be called a liar.

In patent cases, we are usually dealing with ascertainable facts. Even so, there is still a large field for expression of opinion and my own view is that men of the calibre of our Federal Judges have had such long experience in listening to testimony that they can detect almost at once when a witness departs from reason in interpreting facts or in giving an opinion.

Expert witnesses are sometimes criticised for interpreting claims and assuming functions which are the functions of the Court. I believe that whenever an

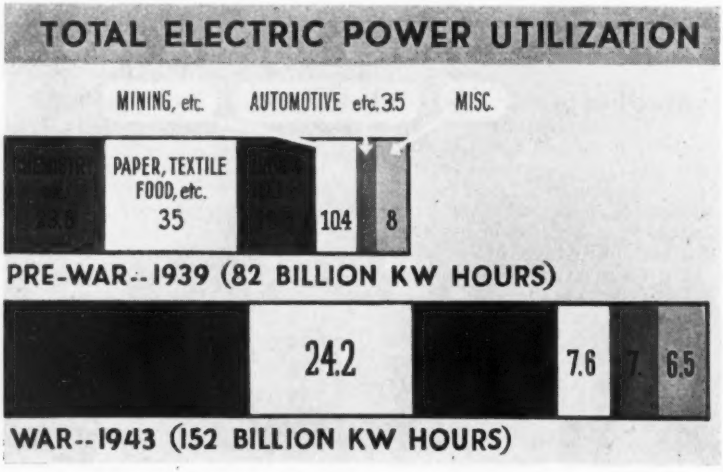


Chemical Industry now Largest Power User

THE CHEMICAL Industry as shown below, which includes the light metals (aluminum and magnesium), oil refineries, butadiene and styrene plants, as well as specialty chemicals such as chlorine and caustics, and other allied products, is the largest user of electric power of all industries in the war period, according to H. E. Dralle of the Westinghouse Electric Corp.

From a prewar consumption of about 19 billion KWH per year the chemical and allied industries at their peak consumed over 67 billion KWH, a growth of more than 250 per cent as illustrated above. It is estimated that the postwar power consumption in these industries will approximate 38 billion KWH annually, just double that in prewar years and about 43 per cent less than the wartime peak.

The capacities of chlorine, caustics, and other specialties plants have increased 100 per cent, adding four billion KWH per year to central station loads. New plants manufacturing butadiene and styrene, the principal ingredients of synthetic rubber, and refineries changed over for making high octane gasoline will add several million KWH to this total.



expert witness gives such testimony or testifies in such a way that his integrity may be questioned, his own legal counsel is invariably responsible. Ordinarily, a witness gives such testimony only under pressure from his counsel, and counsel customarily knows beforehand just what the witness's testimony will be on all important issues. Under such circumstances lawyers themselves are to blame and the witness should be criticized chiefly for yielding to pressure by counsel.

I would call attention to the fact that there is no very exact definition or standard qualification for an expert in Court cases and, in practice, the term has come to mean practically anyone who has had a general technical education which might apply to the issues of the case. This probably accounts for the fact that a few chemists have acted as experts in an extreme variety of cases, including many very widely dissimilar industries. Even here the responsibility for this fact, and criticism, if any, should be divided between the lawyers and the individuals who so extend their alleged field of expert knowledge.

It is sometimes true that the real expert who has the most extensive and thorough knowledge of a subject is unsuited by nervous temperament, or for some other reason would not make a satisfactory witness and could not stand the gruelling a witness sometimes gets for many days on the stand. In such cases, it is sometimes necessary for the experienced witness who may be informed only as to the fundamentals or the rudiments of the matter in dispute to state the matter extensively, if there is time, and, in fact, make himself an expert on the subject. However, in my opinion, the real expert of long experience in a particular industry is, generally, to be preferred.

Any witness needs long and careful coaching by his associated attorneys. I have known one or two individuals who liked to tell counsel how to run their case and I have known one or two who practically refused to be coached, assuming that their knowledge was so great that no mere attorney could ever mix them up. These situations usually turn out very badly.

CONCLUSION

Such experience as I have had leads me to conclude patent suits in which experts are used are, generally, on a high ethical plane and are conducted with considerable decorum. A witness has really very little to worry about so long as he tells the truth and takes no false or strained position when it comes to opinions when it cannot be fully defended. After extensive consultation with his own counsel, he then needs suffer no particular nervous wear and tear in giving expert testimony.

Based on talks made by the authors before the Association of Consulting Chemists and Chemical Engineers, New York, N. Y., April 30, 1945.

OUTLOOK for GLYCERIN

OUR 200,000,000 POUND PRODUCTION OF GLYCERIN in 1944 set a new record. The crisis in the supply situation is past, but a continually increasing demand for this versatile material makes conservation of fats imperative

PER CAPITA consumption of soap in the United States has long been the highest in the world; and consequently, our output of glycerin has always been high. Even so, it was not high enough to satisfy the demands made for it by a global war and increased civilian consumption. As demand exceeded supply, the War Production Board initiated control, through General Preference Order M-58, effective March 30, 1942, regulating the delivery, use, and inventory of glycerin. In spite of these restrictions stocks continued to decline, and on September 3, 1942, it was put under complete allocation.

In the meantime the supply situation of fats and oils required by soapmakers was found to be unfavorable, due largely to the cutting off of imports from the Far East. It was then that the intensive waste-fats-salvage campaign was launched. This campaign, although directed primarily to the American housewife, also included restaurants and hotels. While the quantities recovered from these sources were large and went far to alleviate the critical shortage of glycerin, they fell short of total demand. The result was that specifications for the recovery of glycerin in soap manufacturing and fats splitting were set by WPB's Order M-193, which became effective in December, 1942.

SUBSTITUTES

As the use of glycerin became more restricted, the search for substitutes became more intensive. Because of its varied applications, many products were employed as replacements, the choice depending upon some physical or chemical property it possessed and the purpose for which it was to serve. Among the more important may be mentioned ethylene glycol, diethylene glycol, triethylene glycol, propylene glycol, starch, sugar, glucose, mannitol, sorbitol, ethyl alcohol, lactates, and apple syrup. In some instances the material intended as a replacement was, or soon became, as scarce as glycerin itself.

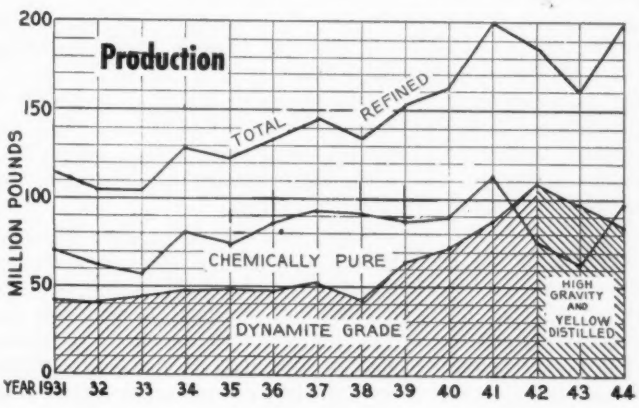
The price situation, although not publicized so widely as that of supply, was given earlier consideration by the Office of Price Administration with the issuance of Maximum Price Regulation 38, effective November 10, 1941. The delivered price of high gravity glycerin in drums by carlots had advanced from 12¢ per pound in April, 1940, to 19½¢ in October—an increase of 62½ per cent. The regulation established the price at 18.3¢, but the current price is below the ceiling.

SUPPLY

During the latter part of 1943 the supply position improved considerably. This was brought about by several factors: increased recovery of glycerin from soap manufacturing and fat splitting, made possible by the utilization of waste fats; restrictions on use; the shift in military requirements; and increased imports. Almost 10,0000,000 pounds of crude glycerin were imported in 1943—an increase of 60 per cent over 1942.

As supply and demand became more nearly balanced, the various orders were relaxed or temporarily suspended. On April 1, 1944, the order (WFO-34) regulating use was revoked. This action was followed on June 28, 1944, by the termination of the order (WFO-33) which prescribed the standards for recovery from hydrolysis of fats and oils.

The need for glycerin for war purposes is still great, and efforts to conserve fats should not be relaxed.



OUTLOOK

The outlook at present is favorable. Production has been well maintained, as the graph shows. Consumption of the refined grades rose from 38,652,000 pounds during the second quarter of 1944, when restrictions were removed, to 44,457,000 pounds for the last quarter of the year. Consumption the early part of this year indicated a continued expanding demand. On the other hand, stocks, which had been considered by some as excessive, have been reduced from about 83,000,000 pounds at the end of June to about 74,000,000 pounds at the end of January.

Some idea of the postwar demand for glycerin may be had by estimating the outlook for those commodities which consume glycerin, the consumption distribution for which, in 1941, was as follows:

Product	*Thousand pounds*	*Percentage*
Synthetic resin and ester gum	40,234	23.0
Tobacco	25,793	14.7
Dynamite and nitroglycerin	30,624	17.5
Cellulose films and meat casing	18,973	10.8
Dentifrices and toilet articles	11,313	6.5
Drugs and pharmaceuticals	10,874	6.2
Gaskets and cork products	8,019	4.6
Printers' rollers and supplies	5,047	2.9
Margarine, shortening, and other edibles	4,057	2.3
Adhesives	2,871	1.6
Textile processing	2,827	1.6
Beverages, flavors, candy, and gum	2,411	1.4
Glassine, greaseproof and vegetable parchment	2,008	1.2
Rubber processing	1,802	1.0
Cleaning materials	1,589	0.9
Paper other than glassine or greaseproof	1,540	0.9
Manufacture of chemicals	1,408	0.8
All other	3,743	2.1

Source: Bureau of the Census, U. S. Dept. of Commerce.

The largest use of glycerin is in the manufacture of synthetic resins and ester gums which, in turn, are used mainly for protective coatings. An increased demand for alkyl phthalates can be anticipated from this field as well as from the field of waterproof and mildewproof coatings for civilian fabrics after the war.

The clearing of devastated cities and harbors, as well as highway construction, can be expected to maintain a high demand for explosives.

In view of the current tobacco demand it would appear that considerable time may elapse before the glycerin requirements in the tobacco industries can be expected to relax.

The use of transparent cellulose film for the packaging of fresh meats and fish was on the increase until war curtailed is use. A larger consumption of glycerin through this channel can be expected when it is available for all wrapping purposes.

Expanded medical and hospitalization plans, coupled with an increased appreciation of health measures, can be expected to require more drugs and pharmaceuticals. The cosmetic industry, too, can look forward to a growing market for its products.

The aggregate consumption in minor uses, although the individual percentages are small, represents a very substantial amount of glycerin. Most of these uses are well established, and the future demand from these sources is assured.

From the above it appears that the postwar demand for glycerin will equal or exceed that of the prewar period.

Dr. J. Zender, head of biological research at Gallowhur Chemical Corporation, looks on as a laboratory assistant counts bacteria by means of a bacteria colony counter.

RESEARCH Under PRESSURE

A Small Chemical Company at Work

by GEORGE GALLOWHUR, President
Gallowhur Chemical Corporation, New York, N. Y.

THE RESEARCH ACTIVITIES OF A COMPARATIVELY SMALL concern differ in practice from those of its larger competitors. We presented last December an outline of Du Pont's organization for research, and now we give you the other side of the picture—how a research program has enabled a smaller company to expand and secure its niche in the competitive world.

HENRY A. WALLACE stated recently in a magazine article: "In 1937 thirteen corporations possessed the services of one-third of all the country's industrial research scientists. In 1942, under the influence of this tendency, 75% of our war product contracts were held by fifty-six of our corporations." It would be interesting to have more recent statistics on the number of corporations that now employ industrial research scientists. It is not likely that today thirteen corporations possess the services of one-third of the country's total number.

There is a logical reason for the adoption by many industrial corporations of scientific research divisions. They have found that in order to operate economically and efficiently, they must have scientific facts; and in order to operate progressively they must have information on all possible uses of their products and those of their competitors, and knowledge of how best to use their machinery and facilities.

The operations of a research organization owned by a small industrial firm are generally different from those of a large corporation. This is only natural in that the large units can afford to operate without an immediate return on their investment. The research department of a small corporation must operate in narrower fields and on specific problems supported by a limited budget. In the case of the small corporation, if a specific problem is not solved quickly, it may prove financially impossible to continue the research program. Thus, while the research departments of large corporations can "try, try and try again," those of small corporations must produce "quickly—or else." In other words, the small corporation research laboratories are working under pressure.

There is another acute difference between the research department of a large corporation and that of a small one: in the progress of a specific research development program, four or five products may be developed which could be put to use immediately by the large corporation with its varied manufacturing and marketing facilities. On the other hand, the small corporation is not able to make use of the many new products at once because of its limitations, and is not, therefore, able immediately to capitalize on the findings of too extensive a research program.

During recent years practically every company working for the war effort has expanded in many directions, and the amount of time, money, and effort spent by all the corporations on industrial reseach is extensive. The postwar economy will naturally see reductions. It is hoped however, that the research divisions recently activated by the various corporations will not suffer in direct proportion to other necessary retrenchments.

The adoption of a research laboratory by Gallowhur Chemical Corporation was brought about by a normal growth in the company's activities and an appreciation of the value that scientific research has in modern industry.

In the very beginning we availed ourselves of the brains and facilities of "outside" chemists and research laboratories; but as time went on, experience told us that in order to take full advantage of the findings of the chemists, as translated into plant operation, we should have to be concerned with closer coordination with production and pay more attention to the technical problems with which the production department would have to contend. Today the laboratory consists primarily of three divisions—chemical, biological and mechanical. Each division, although small, is staffed by a group of research chemists and operates in cooperation with the Executive and Sales Committees.

ORGANIZATION

Research policy is determined at Gallowhur by the New Products Committee. This group is responsible for the initiation and evaluation of new ideas, either for new products or processes or for the improvement of existing ones. The New Products Committee makes its recommendations to the Executive Committee, which represents the stockholders and officers of the corporation. If the Executive Committee approves of a project, the various departments are informed of the proposal through their respective heads, working together as the Operations Committee. This makes it possible for developmental work to be started in sales, patent protection, purchasing, and the like, while scientific work is still progressing in the laboratory.

When the Executive Committee approves of a project, the research administrator is informed of this decision by the New Products Committee. He then works out the research procedure with one or more of the heads of the three divisions—chemical, biological, and

mechanical—as many as are affected by the project.

The results of the investigations, in turn, influence the future decisions of the New Products Committee, and the cycle of coordination is complete.

BUDGET

The budget for research varies from year to year, of course, and is controlled by several factors such as net profits, economic conditions, and specific demands made by various divisions of the corporation. Although it is undoubtedly best to set aside yearly a specific amount out of net profits, this is not always practical for smaller corporations in that its research must, to a certain degree, operate on a more or less flexible basis. During the years 1942, 1943 and 1944 a very large percentage of net profit had to go into research because of the demands made upon the laboratory for essential war materials—for the development, for example, of insect repellents for the control of malaria, insecticides containing DDT, a pocket-size apparatus for producing drinking water from sea water without the use of chemicals, formulas for treating materials to render them mildew resistant, and other vital war materials.

During peacetime it will undoubtedly prove impractical to spend as great a percentage of profits on pure research as during a war. This is only natural, since the demand for new products in huge volume will not be the same. It is impossible to expect the laboratory to turn out, as it can today, a new formula that meets a specific military requirement and receive the following week an order for a million or more dollars' worth. During peacetime there will be no immediate return on a new product. Even a product in great demand must have large selling costs for acceptance in the civilian market. After total victory it will be necessary for us to buckle down again to the old hard-headed type of marketing and selling which, of course, costs more money; and although the actual percentage return per unit sale is considerably greater than when selling to the government, as it should be, still there will be considerably greater risk in selling to the consumer market than to some division of the Armed Forces that has set up specifications for a product to meet a specific need.

RESULTS

To give a more specific pattern as to how a research laboratory owned by a small corporation may actually work, the following examples are illuminating for the reason that they concern the function of a research department that consists of a chemical, a biological and a mechanical division.

Skat is today one of the country's well-known trade marks in the insect repellent and insecticide fields. The problem of Skat, resolved down to its fundamentals, was to create a product that had lasting insect-repellent characteristics (over three hours), would give special repellency to the *Anopheles* mosquito, and could be applied to all exposed surfaces of the skin without causing irritation.

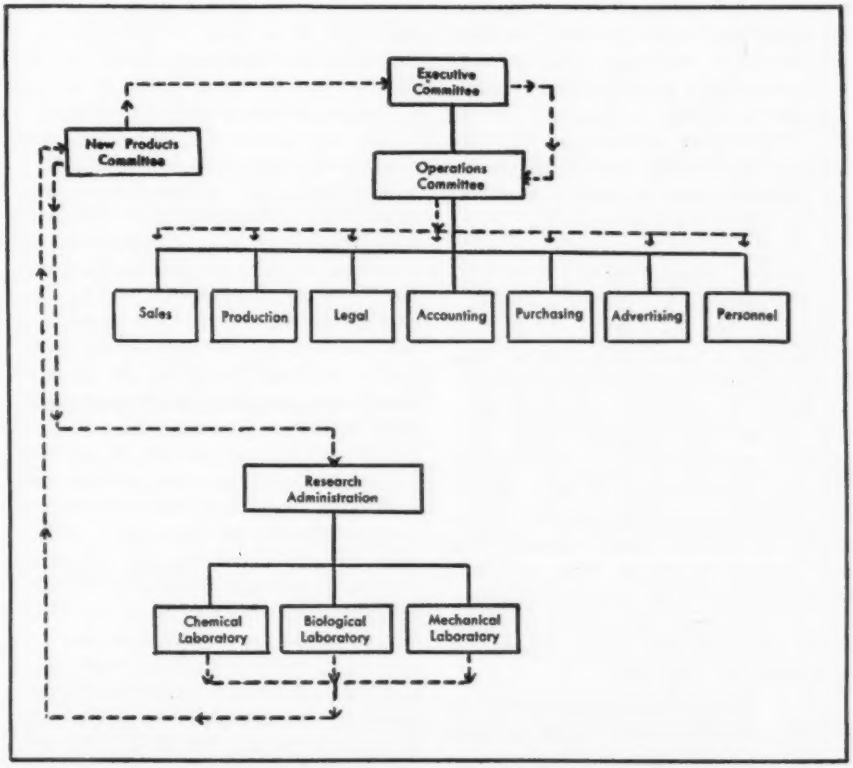
From the standpoint of production, it first involved a chemical problem of formulation; next, a scientific research program to determine efficiency; then a biological and bacteriological search to establish beyond any reasonable doubt that the product was not harmful when applied to all types of skin. The difficulty in this particular case was that it is impossible to standardize the personal equation. It was necessary, too, to hold the function of the compounds examined within specific limitations. Much credit for the development of the insect repellents, of course, should go to the companies manufacturing the chemical concentrates and to various independent laboratories. Even prior to the war the Department of Agriculture had extensive research programs under way; when the demand actually came, they were in a position to meet requirements. The efficient insect repellents now used by our armed forces are a perfect example of teamwork between the technical divisions of several corporations, the Department of Agriculture, the Office of the Surgeon General, and other government agencies devoting their time to procurement.

To do full justice to the story behind the development of the Gallowhur Sunstill—the apparatus for producing drinking water from sea water—would take many pages. The Sunstill, however, is another excellent example of the coordination of the efforts of (a) determined, imaginative management; (b) a capable sales division; and (c) a visionary yet practical research department. Most of the credit, of course, in this particular development goes to the mechanical division.

PROGRESS

Despite the fact that Gallowhur Chemical Corporation is a comparatively small company, it has been able to compete successfully in the fields in which it is primarily interested. Its research departments have played an important part in the company's obtaining this enviable position. Recently there was released by the company an advertisement in which there was made a statement that the company pledged the employment of 25% more workers than were employed before the war. This was made possible by the confidence the management has in the future of its products, many of which are now being used entirely for war.

Industry-wise there are many other organizations whose experiences reflect those encountered the last few years by Gallowhur Chemical Corporation in that they were made possible through the work of their wide-awake research activities. Certainly with the examples that are now at hand, and the many contributions that research laboratories have made during the war period, they should be continued during peacetime—and in the case of the smaller corporations, they will undoubtedly still be operating "under pressure."



How the Research Department is integrated into the organization of the Gallowhur Chemical Corporation—a typical small chemical company.

Are You Ready for the Veterans?

EDITORIAL STAFF REPORT*

THE CHEMICAL INDUSTRY FACES A CHALLENGE in the rehiring of discharged servicemen. It is a difficult personnel problem fraught with a responsibility that goes far beyond ordinary business considerations. Because of the urgency of this obligation, every employer must be thoroughly familiar with his legal duties and rights, and with the overall personnel adjustments which the rehiring of veterans will require.

SOLDIERS are returning from battle. They are returning, most of them, with the expectation of picking up where they left off with their old jobs—and it is the legal responsibility of employers to see that they get them.

Compliance with the law will cause actual hardship in some cases, and in any case it will create unusual problems of adjustment for employer and employee alike. The serviceman has been led to expect not only a job, but a job to his liking; he may have been rendered psychologically unfit for his old job; or on the other hand, he may have acquired skills or enjoyed responsibilities in the service which should not be compressed within the confines of his former, inferior employment. The employer, too, is subject to the vagaries of business fortunes: he may be unable to maintain his prewar labor force; the characteristics of his labor requirements may have changed; his operations may have been modified to make use of new techniques; his substitute employees may be more skillful, efficient, or likable. These are not all the problems, by any means; but they indicate the difficulty and complexity of the situation with which the employer and the veteran are confronted.

HOW MANY?

Wide publicity has been given to surveys which indicate that only 25 per cent of returning veterans want their old jobs back. This figure is misleading because it reflects the abnormal manpower situation of the war economy. With jobs plentiful and workers scarce, demobilized veterans have been able to shop around for the highest paying employment. When the end of the war lessens opportunities, the pressure to get old jobs back will mount sharply. The majority—probably around 60 per cent—of those mustered out at the end of the war can be expected to seek their previous jobs.

The Government's educational program and loan provisions will reduce to some extent, of course, the number looking for jobs. Any veteran who was under 25 at the time of induction, or one over 25 whose schooling was interrupted, can choose to go to school at government expense. There are no accurate estimates of how many will take advantage of this offer, but indications are that most will come back looking for jobs rather than schooling—particularly if they were already working before they left for military service. In this connection a comment by President Conant of Harvard University is significant: "I am firmly convinced that the ambitious, imaginative student whose college education has been interrupted by two, three, or perhaps even five years of war will be sorely tempted to forego further study and get established in a job. The evidence from letters of inquiry . . . can be cited to the contrary. But there is a vast difference between what a young man now immersed in the task of fighting a war thousands of miles away thinks he will do when he returns, and what he in fact will then decide to do."

The widespread publicity which was given to the loan provisions of the G. I. Bill of Rights has led some businessmen to believe that there will be an upsurge of competition from new small business enterprises. At the same time they feel that their own rehiring problems will be lessened by the number of ex-employees who will prefer to go into business for themselves. It is not likely that the Government's loan program will have these results in any substantial measure. The Government guarantees only 50 per cent of a loan up to a maximum principal sum of $4,000. These loans bear a 4 per cent interest rate, but the Government undertakes to pay interest for only one year.

There is no doubt that some returning veterans will, with the aid of the G. I. Bill of Rights loan provisions and assistance of the Smaller War Plants Corporation, establish themselves in new enterprises. Realistically, however, it must be remembered that the G. I. loans will not, in all probability be made available much more easily than run-of-the-mill bank loans. There is not likely to be any great rash of new small business undertakings as a result of the loan program.

OBLIGATIONS

The employer is charged with the legal duty of restoring to his or her former job or to a job of like seniority, status, and pay, any individual who:

1. Has been discharged under honorable conditions from the Army, Navy, Marine Corps, Coast Guard, Army Nurse Corps, Merchant Marine, WACS, WAVES, SPARS (but not Coast Guard Auxiliary).

2. Applies for such reinstatement within 90 days of being mustered out; or within 90 days of the end of hospitalization, if continuing for less than one year after discharge.

3. Is still able to perform previous or comparable duties.

4. Was a permanent, not a temporary employee—unless the employer's circumstances have so changed that such reemployment is "impossible or unreasonable."

The law draws no distinction between those who have had combat duty and those in training, nor between those who were drafted, volunteered, or were commissioned. All are entitled to the same reemployment rights. There is no obligation, however, to rehire conscientious objectors or any veterans discharged under other than honorable conditions.

Failure to comply with the law will lead to intervention by the local draft board. If the employer still persists in his refusal, suit will be brought by the United States district attorney. The court may order reinstatement with restitution of back pay and any other benefits the veteran may have lost on account of the delay. If the employer refuses to obey the court order, he is guilty of contempt and subject to fine or imprisonment. It is likely that this power will be exercised more often than that granted by the Selective Service Act (Sec. 11) which provides imprisonment up to 5 years and a fine up to $10,000.

INTERPRETATION

These laws raise important questions of interpretation, many of which have still not been cleared up. Since employers will have the task of making concrete decisions in terms of their understanding of legal provisions, it is important to anticipate the kinds of confusion that are likely to arise.

Employment. Selective Service has not

* The editors are indebted to the Research Institute of America, Inc., for much of the information on which this article is based.

set forth any precise criteria, but it is safe to assume that a veteran will be considered a former "employee" of your company if he rendered regular and continuing service in any capacity other than that of an independent contractor. A re-recent decision of the Third Circuit Court of Appeals found that the law, while not applicable to an independent contractor, embraces virtually every other form of employer-employee relationship except casual or temporary workers who are expressly counted out in the Act. If there is any doubt as to whether or not a particular veteran was an employee or an independent contractor, Selective Service will resolve it in favor of re-employment. The courts will back up Selective Service in extending the concept of "employment" as widely as possible in the interest of the returning veteran.

Even a veteran who quit his job to enlist or to accept a commission, or who took a vacation before impending induction is, in general, eligible for protection under the law. If some form of military service was anticipated when the veteran left his employment, he is entitled to complete reinstatement.

Succession of jobholders. With one important exception, the employer is required to rehire only the *first* incumbent of a job who departed for military service. Succeeding incumbents are regarded under the law as temporary employees.

The exception is this: Suppose that a permanent employee is drafted and a second permanent employee is transferred or upgraded into his position, only to follow the former into service. If they both return, they are equally entitled to reinstatement in their *original* permanent positions. The second man is not considered "temporary" merely because he was transferred into the job vacated by the first man, although he would be had he been brought in from the outside. Note, however, that a "temporary" worker may be come "permanent" if, after his hiring, he is transferred or upgraded to a new position—one not arsing from the induction of a permanent employee. The ruling would depend on the facts of a particular case.

Temporary employment. It is generally understood that a person hired to pinch-hit for an employee in uniform is a temporary employee. It is not so widely known, however, that a second class of temporary employees is made up of those hired for jobs created solely for war purposes—jobs that will end when the war ends. Employers are not required to rehire those of this class who have gone into service unless the job is still in existence at the time the veteran comes back (in which case the right to employment ceases with the job) or unless the company decides to continue the "temporary" war job as part of its regular, postwar operations. Such a job, however, cannot be construed as a "temporary" job if it involves essentially the same operations as the normal business of the concern.

Contracts. One way of avoiding confusion is to enter into a contract with employees hired to replace inductees or for temporary war jobs; but such contracts will be carefully scrutinized by Selective Service in view of the fact that many permanent positions, in the common practice of many firms, are covered by definite-term contracts which are periodically extended.

An employee may, in return for certain considerations, waive his right to reinstatement by agreement with his employer. Such waivers are completely valid, although the burden of proving that there was such a waiver rests upon the employer. If a veteran refuses his old job, the employer should protect his own interests by asking for a signed waiver. If the veteran is rehired later, he has forfeited his other rights appertaining to his re-employment.

LOSS OF QUALIFICATIONS

Although the law says that a veteran need not be rehired if he is no longer qualified to handle his old job, this provision will be construed very liberally in favor of the serviceman. A refusal to rehire will be justified only where the veteran is suffering from such mental or physical disabilities as would make it impossible for him to perform his former duties—for example, a laboratory technician who had lost his hands.

An employer cannot refuse to rehire a veteran on the grounds that he has lost his old skill, or is not familiar with new developments, techniques, or procedures now used in connection with his job. In such cases the employer is expected to provide whatever training or education is necessary to fit the veteran for his former position. Where a position has been upgraded to such an extent that it is beyond the veteran's skill even after a retraining course, he is entitled to a job comparable in skill, seniority, status, and pay with that which he vacated.

Application period. The 90-day period during which the returned veteran can apply for reinstatement begins with the date of the veteran's receipt of his discharge papers, or the date of his release from hospitalization (unless it continues for more than one year after discharge). Generally, he must not only apply for his former post, but must be ready, willing,

PROBLEMS OF VETERAN REEMPLOYMENT

What does "employment" mean?

How do you determine which employees were "temporary" and which were "permanent"?

When does a "temporary" employee become "permanent"?

What about contracts the employer may have made with "temporary" employees?

What is the employer's obligation where a succession of jobholders has left for service in the Armed Forces?

When is a veteran "still qualified to perform former duties"?

Does loss of skill disqualify a veteran?

When does the 90-day application period begin to run?

These questions are typical of the many which require authoritative interpretation for the guidance both of employers and of returning servicemen.

and able to start work at the expiration of that period.

If an employer rehires a veteran who has not complied with the law, both of them forfeit certain rights: For instance, rehiring of the veteran may necessitate the discharge of another worker who is covered by a union contract; unless the veteran is rehired in accordance with Selective Service regulations, the employer is subject to legal action on the union contract. Moreover, the veteran is not legally entitled to the law-given benefits of seniority, status, and pay, although the employer may grant them of his own volition.

It may be advantageous to both parties to delay the beginning of re-employment; the veteran may want a rest, or the employer might like to have some time to find a spot for the displaced worker: In this case the veteran should be rehired and granted a leave of absence, and all parties concerned, including the displaced worker's union representative, should be made fully cognizant of the circumstances. If the veteran insists on immediate employment, on the other hand, he is entitled to it insofar as it is possible for the employer to provide it. The convenience of the employer is never an excuse for delaying the veteran's reinstatement.

Conditions of re-employment. A change of location is a matter for mutual agreement between the employer and the employee. The veteran may not require the employer to give him a job in a different location, nor may the employer require him to accept a job in a different location if the original job is still established at his former place of employment. If an employer operated plants in different localities, one of which has been closed, an ex-employee of the closed plant may claim a job in one that is still open.

The veteran is entitled to the same compensation for his work as he received when he left. If there have been any changes in the wage or salary scale in his absence, either increases or decreases, he will receive the altered compensation.

Certain benefits initiated in his absence, such as a pension plan, or group insurance, are not guaranteed to the reinstated veteran. He cannot claim its benefits retroactively upon his return. So far as such benefits are concerned, the law considers the veteran to have been on a leave of absence from his job.

Even though an employer offers a veteran a job with greater pay, the veteran may refuse it on the claim that it does not offer similar prestige. Selective Service has stated specifically that "a veteran is entitled to his former position or one of like seniority, status, and pay and may refuse another even though the pay is greater and offers other advantages."

One-year guarantee. Once rehired, the veteran cannot be discharged for one year except for good cause. Selective Service has not defined good cause, but certain guides can be indicated. Reasons for justifiable dismissal which have been recognized under state unemployment insurance laws are likely to be followed. These include carelessness and negligence, flagrant disregard of instructions, unexcused absence, repeated tardiness, intoxication at work, insubordination, and dishonesty. It is expected that greater leniency will be shown to veterans than to non-veterans in regard to the less serious infractions.

CHANGED CIRCUMSTANCES

All laws concerning rehiring stipulate that the employer is not to be forced to re-employ a serviceman if the company's circumstances "have so changed as to make it unreasonable or impossible to do so." The courts and Selective Service can be expected to hold to a minimum the number of cases in which the employer is relieved of his duty.

In a leading test case a Circuit Court of Appeals ruled that the "unreasonable circumstances" clause is intended primarily "to provide for cases where necessary reduction of an employer's operating force or discontinuance of some particular department or activity would mean simply creating a useless job in order to re-employ the plaintiff (veteran). 'Unreasonable' means more than inconvenient or undesirable. The Act intends that the employee should be restored to his position even though he has been temporarily replaced by a substitute who has been able, either by greater efficiency or a more acceptable personality, to make it desirable for the employer to make the change a permanent one."

It is likely that all doubtful situations will be resolved in favor of veterans. All legal and administrative rulings will give the veteran every possible benefit of the doubt—or current legislation will be amended until they do.

To clarify the meaning of "changed circumstances" Selective Service spokesmen used this illustration:

A talking-doll factory prior to the war employed three veterans, A, B, and C, who were a boiler-room stoker, a skilled mechanic, and a decorative painter respectively. The plant converted to the manufacture of telescope parts and was still engaged in that activity when the men applied for re-employment. The stoker, A, got his job back without question, for no circumstances of his job were changed. The mechanic, B, who formerly worked on the dolls' talking mechanisms, was re-employed as a mechanic on the telescope parts; the circumstances were indeed changed, but not sufficient to make reinstatement "unreasonable or impossible." But C, who formerly applied dabs of paint to the dolls' cheeks, was not entitled to a job; for there was no operation in the manufacture of telescope parts comparable with his former employment.

Obligation to rehire is not rescinded by a change of ownership of the company. Even if an employer closes down his business, the obligation attaches itself to any new business he may start, provided that the jobs are similar to those vacated by veteran ex-employees in the first business. Neither are changes in shift schedules, alterations of production methods or techniques, rearrangements to accommodate women workers, or promises to temporary workers valid excuses for failure to comply with the law under the "changed circumstances" clause. No change in the operation of a business makes any difference as long as the particular company is solvent and has jobs to offer—positions that can be filled by means of extra training, by upgrading, internal rearrangement of personnel, or any other common-sense adjustment.

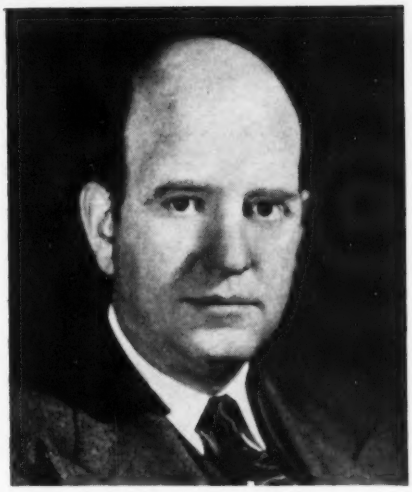
There are cases, however, where definite hardship would result from compliance. If an employer had ten workers, for instance, five of whom were inducted and later applied for reinstatement; and if in the meantime his volume of business has dwindled so that it can support only four employees, he is required to rehire only four of the five, discharging his four substitute workers to make room for them.

SENIORITY

Selective Service endows the veteran with "reinstatement in his former position or one of like seniority, status, or pay even though such reinstatement means the discharge of a non-veteran with greater seniority."

The contest over jobs between servicemen and anyone else must be decided, under this ruling, in favor of the veteran in virtually all cases—irrespective of collective bargaining agreements, normal seniority practices, company needs, age, relative skill, number of dependents, or other considerations. With irrefutable testimony as to his irreplaceability, an employer may retain an indispensable man; but Selective Service will eye all claims critically. It will be exceedingly difficult for employers to hold highly trained non-veteran personnel if the law is interpreted rigidly. Also, if veterans' super-seniority displaces many war workers in a period of shrinking employment opportunities, active protests may be expected. Pressure to abandon this approach is building up among unions and various other groups, but there is no indication that Selective Service will revise its interpretation. The unions contend that Congress, in passing the Selective Service Act, did not say that veterans should be re-employed at the expense of others with longer seniority; that Selective Service officials in their desire to help veterans have merely read this interpretation into the act. Selective Service officials contend, on the other hand, that Congress has acquiesced in this interpretation of its actions by its failure, in spite of subsequent opportunities, to amend the language of the law.

HEADLINERS in the NEWS



DR. CHARLES ALLEN THOMAS, director of Monsanto Chemical Co.'s research laboratories, has been elected a vice-president and will become an executive committee member.

FRANK C. WHITMORE, dean of the School of Chemistry and Physics of Penn State College, has been selected as Willard Gibbs medalist by the A. C. S. Chicago section.

W. E. REMMERS has been elected vice-president of the Electro Metallurgical Co., a unit of Union Carbide and Carbon Corp. Mr. Remmers was formerly division manager.

COMDR. E. S. PETTYJOHN, former University of Michigan professor, will direct the Institute of Gas Technology at Illinois Institute of Technology.

A. K. SCRIBNER has been named general manager of the Virginia Smelting Co., West Norfolk, Va., succeeding Charles W. Johnson who will become vice-president.

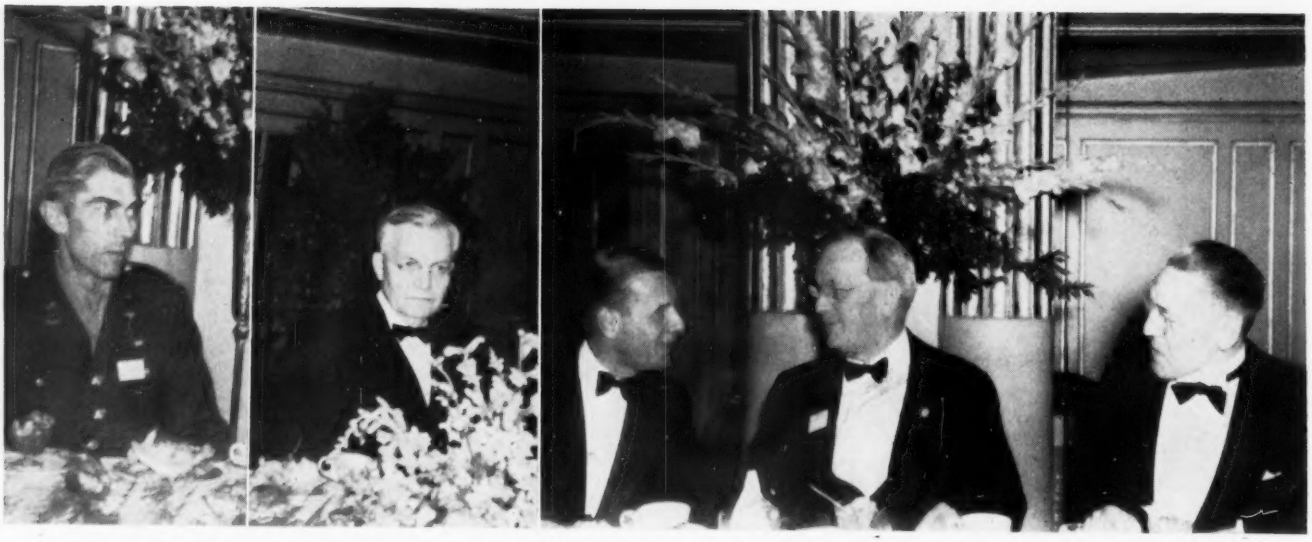
DR. R. M. BURNS, hitherto assistant chemical director, has been made chemical director in charge of the chemical laboratories of Bell Telephone Labs.

DAVID GORDON, recently chief engineer for the Interchemical Corp., has joined the staff of Foster D. Snell, Inc., as director of engineering.

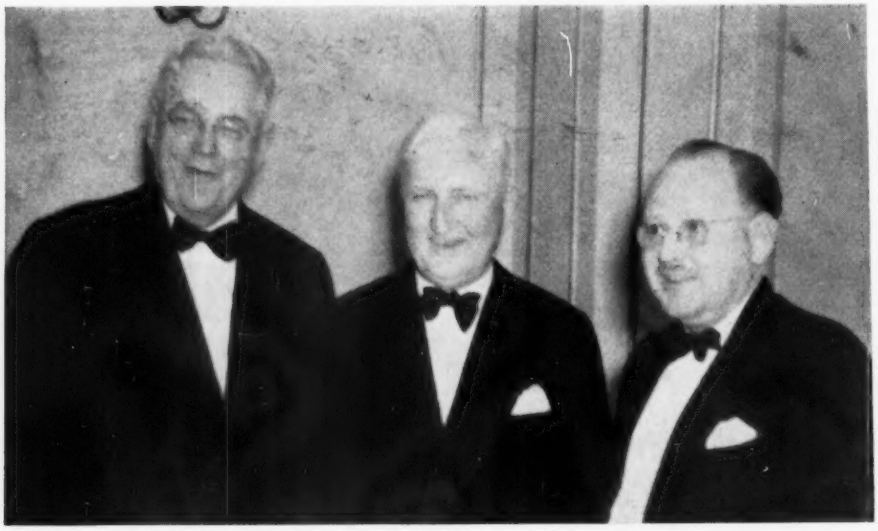
J. A. HOLLADAY has been elected vice-president of United States Vanadium Corp., unit of Union Carbide and Carbon Corp., in charge of the metal chemicals division.

AIC Awards Gold Medal to Thomas

The Miami Valley Chapter of the American Institute of Chemists made its annual Gold Medal Award to John W. Thomas, chairman, the Firestone Tire and Rubber Co., at the May 11 meeting which took place in Columbus, Ohio. E. L. Luaces, chairman of the chapter, introduced Hezzleton E. Simmonds who lauded "Thomas—The Man." This was followed by Bradley Dewey's address on "Thomas—Chemist and Administrator." The medal, which was established in 1926, was presented by Gustav Egloff, president of the Institute. He is shown here with Mr. Thomas on the left.

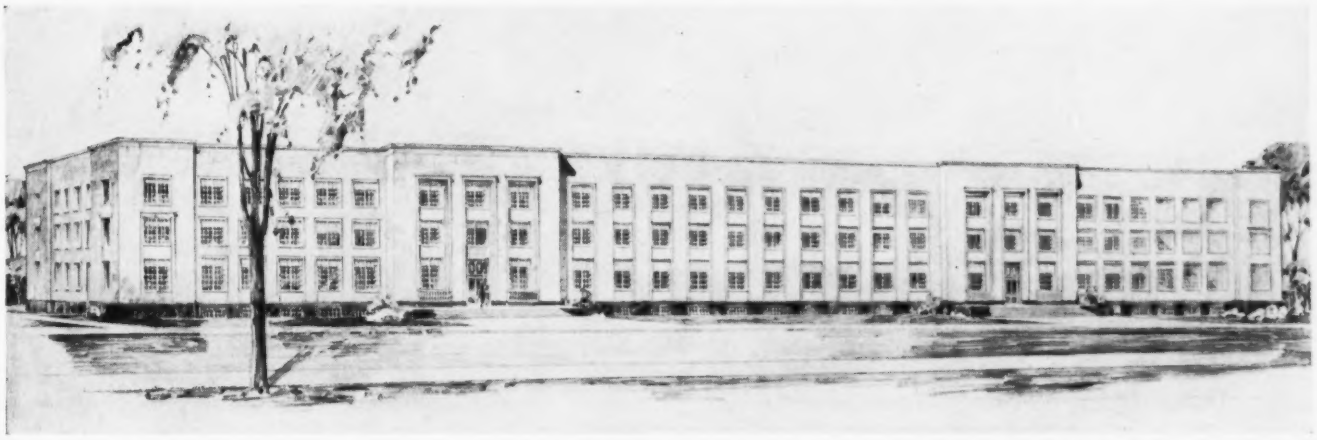


Photographed at the presentation dinner from left to right are Maj. R. W. McLachlan, chemist, U. S. Army Air Force and Hezzleton E. Simmonds, president of the University of Akron. Harvey Firestone, Jr., president of the Firestone Rubber Company is next, and beside him are James R. Withrow of the Department of Chemical Engineering of Ohio State University, who addressed the group in the afternoon on "The Effect of Selective Service on the Training of Engineers and Chemists," and Arthur Shroder, Institute secretary.



Pictured from left to right are Donald B. Keyes, director of the Office of Production Research and Development of the War Production Board, who discussed "Cooperation in Industrial Developments"; Bradley Dewey, president, Dewey and Almy Chemical Co. and president-elect of the American Chemical Society; the medalist; and E. L. Luaces, chairman of the meeting and of the chapter.

New Chemistry and Chemical Engineering Building



Part of the University of Toronto's $5 million dollar postwar construction program will be this $1.5 million dollar chemical engineering and chemistry building, which will be put up on College St. New residences and addition to Banting Institute will also be erected.

Carnegie Library Periodicals

Current periodicals in the technology department of the Carnegie Library of Pittsburgh are photographed at right. During the past winter the Pittsburgh Section of the American Chemical Society began a campaign to establish a technology library fund. A goal of $50,000 was set and to date $66,195 have been obtained with the greater share coming from industry. The fund is not an endowment, but will be used to supplement the library's income.

Touring Canadian Plants

Members of Imperial Chemical Industries, visiting in Canada for a three weeks' inspection of chemical plants are, from left to right, J. C. A. Glenn and L. Donaldson, of Australia, and S. E. M. Wright and V. H. Williams, of England. Assisted here by Canadian Industries, Ltd., an affiliate of their firm, the men are particularly studying explosives for possible use in the coal mines of England and Australia.

Plane Sprays DDT On Spruce Budworm

The combination of a Waco seaplane and DDT is being used to fight the spruce budworm at Kabonga Park in Quebec province. This insect has killed approximately 250 million cords of balsam and red spruce in eastern Canada during the last 25 years and the infected area is said to be extending. The plane, which has been loaned to American and Canadian entomologists by Tom Wheeler of Gray Rock Inn on Lake Quimet is equipped with a special American-made spraying apparatus (see lower picture) whose spinner disk turns at the rate of about 3,000 revolutions per minute. An area of about 1,000 acres has been subdivided into 20 plots for experimentation. In each plot a different formulation of the insecticide will be used. Three thousand pounds of the insecticide have been purchased by the Quebec provincial government for this experiment. It is hoped that the DDT will remain at the tops of the trees and not reach the ground, for there is a possibility that the insecticide may kill the fish in nearby lakes or put an end to insect food for birds. A similar venture is being carried out by the Ontario Department of Lands and Forests. This is described on page 1028 of this issue.

Penicillin Plant Inspection

Four British penicillin plant process supervisors are shown standing before tanks and towers at Commercial Solvents where they have been conferring with American experts. From left to right the men are: Arthur R. Lockwood, Harry Sansbury, John J. H. Hastings, technical adviser at Commercial Solvents. George H. Hines, superintendent of the Terre Haute plant, Robert H. Murray, Frederick H. Foster, and James C. Corrie, Commercial Solvents process superintendent. The Englishmen are from the $5,000,000 penicillin factory located near Liverpool, which is patterned after the Terre Haute plant.

The Military calls it

DDT

The world calls it a

MIRACLE

We call it

SANTOBANE

Monsanto's
Technical Dichloro-diphenyl-trichloroethane

For many months Monsanto has been making Dichloro-diphenyl-trichloroethane for exclusive government use.

It is one of the great wartime developments . . . its lethal effectiveness against the malarial mosquito and the typhus carrying louse has now made its story legend.

How great the peacetime role of Santobane* may be, nobody now can say. Monsanto believes it will be great, though limited in some fields. More must be learned about its toxicity to man as well as its possible harmful effect to plant life. But Monsanto recognizes too its tremendous potentials in control of disease breeding mosquitoes, lice, houseflies, etc., its possibilities in eradicating pests in agricultural fields.

Reg. U. S. Pat. Off.

Santobane is still under allocation by the War Production Board, with only small amounts allotted for agricultural and civilian experimentation. MONSANTO CHEMICAL COMPANY, Organics Division, 1700 South Second Street, St. Louis 4, Missouri. District Offices: New York, Chicago, Boston, Detroit, Charlotte, Birmingham, Los Angeles, San Francisco, Seattle, Montreal, Toronto.

MONSANTO
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BETWEEN THE LINES

Magnesium Technology

Although results are yet unreported, the Interior Department has been working throughout the war on new methods of production and utilization of magnesium and now of utilization of idle magnesium productive capacity. Here is a brief resume of magnesium production methods that have been used commercially during the present war.

UNDER the Interior Department, research has been in progress at a number of pilot plants and laboratories on processes for producing magnesium.

This work is now nearing completion, and at the time new appropriations for its continuation were being considered the Department indicated that a trend toward emphasis on utilization of magnesium productive capacity was under way.

While not so stated on that occasion, a reading of the observations of various officials having to do with the subject, and analysis of reports from several agencies, convey definitely an impression that ways of producing magnesium are not so cogent at this stage as are means of utilizing the magnesium produced. Progress is also reported to have been made on a study of possible new metals, especially titanium, a light metal having strength properties comparable to steel.

The Interior Department officials furnished no details as to the magnesium processes under experiment. However, the fact that this research has been in progress suggests a further discussion of the methods of production which have been in wide use in the United States since the start of World War II.

As mentioned in the first of this series on magnesium (see Between the Lines last month), the U. S. Tariff Commission has made a detailed study of production methods in general use. This information will be presented to Congress at some future date, either in connection with tariff discussions or industry legislation not yet materialized.

Magnesium is produced in the United States by two main processes: electrolysis of magnesium chloride and thermal reduction of magnesium oxide. In this country about 80 per cent of magnesium production is by electrolysis, whereas before this war it was the only method employed. British Magnesium Elektron, Ltd. developed another electrolytic process, the MEL, under German patents, which also has been used in the United States since 1942. The basic difference between the two methods is in the degree of chemical dryness of the magnesium chloride as it is fed into the electrolytic cells.

Pouring a large magnesium sand casting in the floor molding department of American Magnesium's Buffalo, N. Y. foundry.

The thermal reduction processes now in use likewise are in two groups: the carbothermal or Hansgirg process, and the ferrosilicon, or Pidgeon. These processes are based upon the ability, at high temperatures, of certain agents to reduce magnesium compounds to metallic magnesium. The carbothermal process, using carbon as a reducing agent, liberates magnesium in dust form, which is then purified by distillation. The Pidgeon process uses ferrosilicon in place of carbon, and frees the magnesium in vapor form, which is then condensed. There ar various modifications of both processes.

As indicated previously, there are now five different raw materials in use, in place of one used most widely prewar. Magnesium chloride and magnesium oxide are prepared from underground brines, sea water, waste liquors from potash manufacture, and such ores as dolomite and magnesite.

Magnesium chloride is extracted from waste liquors resulting from treatment of underground brines in recovery of such industrial chemicals as chlorine, bromine and iodine. This implies that the volume of magnesium chloride recovered is necessarily geared to the scale of operations in recovery of the other products, but it also means that cost of recovery is borne in part by the associated products (a factor, it might be said in passing, that Office of Price Administration has shown a tendency to apply in principle, in assaying price ceilings in certain other commodities having a somewhat similar situation). Recovery of magnesium chloride from potash-recovery processes follows similar techniques and has a similar cost factor.

Unlimited Raw Material

When the war made it necessary to expand the production of magnesium chloride to meet increased demands for magnesium metal, sea water suggested itself as an unlimited source of raw material. Sea water contains about 0.48 per cent of magnesium chloride. This degree of concentration is far under that in brines and potash waste liquors, but a method of recovery applied to sea water has resulted in costs within approximately the same range as with brines and waste liquors.

The sea water process consists in first precipitating the magnesium content of the water as a hydroxide by use of calcined lime or dolomite, then separation of the precipitate from the liquid. This hydroxide may be converted into magnesium oxide by calcination, or into concentrated magnesium chloride by treating with chlorine gas or hydrochloric acid. Converted into oxide the material is suitable for production of magnesium metal by the thermal reduction processes, or it may be used in refractories, as a cement, and in chemical manufacture.

Converted into the chloride, it may serve as feed for the electrolytic recovery of magnesium. During the peak demand for magnesium, most of the material obtained from sea water was used for producing metal.

However, it is stated, existing sea water plants also produce magnesium oxide for use in refractories and in the chemical industry. Magnesium oxide from this source competes to some extent with chemical and refractory grades of magnesium oxide derived from magnesium-bearing ores.

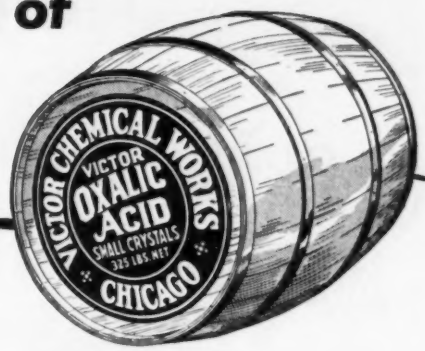
The principal ores used in this country for magnesium production are dolomite (calcium-magnesium carbonate) and magnesite ore (magnesium carbonate). Experiments have been made with magnesium silicates and brucite, a natural magnesium hydroxide. However, only the carbonate ores are used commercially

(*Turn to page 980*)

Continuous production . . .

24 hours a day . . .

that's the wartime record of



VICTOR OXALIC ACID

PARTIAL LIST OF

VICTOR

Chemicals

Acids . . . formic, metaphosphoric, oxalic, phosphoric, polyphosphoric.

Formates . . . aluminum, sodium, sodium boro-.

Metaphosphates . . . aluminum, ethyl.

Orthophosphates . . . ammonium, calcium, iron, magnesium, potassium, sodium.

Oxalates . . . calcium, sodium.

Phosphorus (yellow)

Ferrophosphorus

Phosphorus compounds . . . chlorides, pentoxide.

Pyrophosphates . . . calcium, sodium acid, sodium iron, tetrapotassium, tetrasodium.

Sulphates . . . magnesium, sodium aluminum.

Here is one record of which we are quite proud. It has been made possible only through skillful management, maintenance, and operating supervision. All through the war years Victor's Oxalic Acid plant has been on the job . . . day and night.

The requirements for Victor Oxalic Acid still exceeds the supply . . . but some day, soon it is hoped, we will again be in a position to fulfill the demand for this 99.8% pure product. Clean, sparkling white Victor Oxalic Acid is available in several granulations, and packed in 325-lb. barrels or 130-lb. drums.

Peacetime uses of Victor Oxalic Acid are extensive . . . as a laundry "sour" . . . in radiator compounds . . . for cleaning railway cars . . . removing iron stains from marble, cotton linters, wood pulp, etc. . . . preparing metal polish . . . making blue print paper . . . bleaching wood floors, straw, colored candles (to salvage wax), etc. . . . removing rust stains from rosin . . . making basic dyes . . . as a leather stuffing compound and bleach.

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VICTOR *Chemical Works*

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A Low Cost GRIGNARD REAGENT

$$CH_3Cl + Mg \xrightarrow[dry]{ether} CH_3MgCl$$

with ANSUL Methyl Chloride

YIELDS—excellent, better than 90%.

REACTION—Proceeds smoothly, rapidly, and is easily controlled.

APPARATUS—simple and inexpensive.

ANSUL CH_3Cl—Now a low cost chemical due to greatly expanded production facilities.

MAGNESIUM—readily available and now relatively inexpensive.

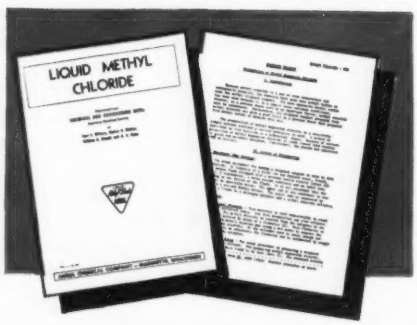
CONCLUSIONS—excellent yield, smooth reaction, inexpensive methyl chloride and magnesium... make a Low Cost Grignard Reagent.

LIQUID Methyl Chloride by ANSUL*

PHYSICAL PROPERTIES

Chemical formula	CH_3Cl
Molecular weight	50.49
Color (gas or liquid)	Colorless
Odor	Ethereal, non-irritating
Melting point	−144° F. (−97.6° C.)
Boiling point	−10.65° F. (−23.7° C.)
Critical temperature	289.6° F. (143.1° C.)
Critical pressure	969.2 lbs. per sq. in. abs.
Solubility	Methyl chloride in water—3 to 4 volumes methyl chloride vapor in 1 volume of water at ordinary temperatures and atmospheric pressure—methyl chloride in alcohol—readily soluble
Specific gravity of liquid	.909

*REG. U. S. PAT. OFF.



Send for Bulletin No. 900, "Preparing Methyl Grignard Reagent with Methyl Chloride"...and for "Liquid Methyl Chloride"—a treatise on the properties and general handling of Ansul Methyl Chloride.

ANSUL CHEMICAL COMPANY, MARINETTE, WIS.

Eastern Office: 60 E. 42nd St., New York City

in manufacture of magnesium metal. Carnallite, a magnesium-potassium chloride mineral, is the basis of much of the German magnesium production from ores. Large deposits are known to exist in the United States, but they have not been utilized for magnesium.

Production of magnesium oxide from dolomite and magnesite ore involves calcination of the ores after concentration, if necessary, by ore-dressing methods. In the one plant in the United States which uses magnesite ore for producing magnesium metal, the magnesium oxide obtained by calcination is treated with chlorine to yield anhydrous magnesium chloride for subsequent electrolysis. Calcination of dolomite produces a mixture of calcium oxide and magnesium oxide from which magnesium metal is obtained by the ferrosilicon method of thermal reduction.

Electrolytic Processes

At present there are in use in this country two major variations of the electrolytic method, differing principally in the degree of hydration present in the electrolytic-cell feed. Both variations are based on the ability of direct electric current to decompose magnesium chloride into its constituent elements under certain conditions. Application of the current to a bath of the molten chloride results in the formation of metallic magnesium and chlorine or hydrochloric acid gas.

Because of the difference in density between the molten magnesium and the other bath constituents, the magnesium rises to the surface, where it may be ladled or tapped off. The chlorine or hydrochloric acid gas rises through the bath, is removed from the enclosed electrolytic cell by a slight suction, and is re-cycled for use in production of magnesium-chloride cell feed. The molten magnesium is either cast into ingots for further treatment or transferred directly to alloying pots.

The MEL electrolytic process, developed in England by Magnesium Elektron, Ltd., under German patents, employs an anhydrous magnesium chloride as cell feed and recovers a virtually dry chlorine. The Dow process treats a cell feed which contains some chemically combined water (magnesium chloride monohydrate), consequently the process recovers chlorine from the cell in part as hydrochloric acid gas. Both processes consume about the same amount of power, but it is stated that less chlorine is recovered by the Dow process than by MEL. On the other hand, it is said, more metal is recovered by the Dow cell than by the MEL cell.

The Trail Mathieson process is a variation, the electrolytic cell differing in mechanical design from that of Dow. The same type of cell feed is used. The Trail Mathieson cell is reported to give better recovery of chlorine, although operating results are not available to confirm this,

(*Turn to page 1057*)

Enemies in an Undeclared War

NAYLEE
NAYPAR
CHLORINATED PARAFFIN
FOR
FIREPROOF
WATERPROOF
AND
MILDEW-PROOF
COATINGS

One of the biggest selling points postwar textiles and fabrics can offer is being tried and proved *now* on our farflung battlefronts, from the merciless tropical heat of Borneo to the icy wastes of the Aleutians.

Today NAYLEE NAYPAR CHLORINATED PARAFFIN is helping safeguard Allied lives and matériel against the ravages of fire, water and mildew. Tomorrow it will help protect many different types of products against these same destructive forces.

The need for fabric treated so as to render it resistant to fire, water and mildew, demanded improved techniques. Tested and approved—successfully used in the impregnation, along with other pigments, of millions of yards of canvas, duck, and other textiles, for the armed forces, **Naypar** has demonstrated its dependability under the most trying conditions.

Now **Naypar** is ready to do a job for you — the fact that it is noted for its stability, uniformity and compatibility and is misciple in a wide range of solvents makes possible a much broader application for chlorinated paraffin, which indicates many new uses in other fields. Consult us with your problems. Our chemists may be able to help determine the suitability of **Naypar** to your product. WRITE for FREE, informative folder giving complete technical information.

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CHEMICALS
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NAYLEE CHEMICAL COMPANY
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CHLORINATED HYDRO CARBONS · MURIATIC ACID · WETTING AGENTS · TUBE DRAWING COMPOUNDS

NEW PRODUCTS & PROCESSES

Fast Drying Varnish Oil NP 101

Spontaneous polymerization, low acid value, and improved quality are the advantages claimed for a new linseed varnish oil recently announced by the research laboratories of Spencer Kellogg and Sons.

Ordinary linseed varnish oils, depending upon the origin of the flaxseed, may be bodied to a Z-5 viscosity (Gardner-Holdt Scale) at a temperature of 590° F. in from 5 to 7 hours. So-called fast bodying linseed varnish oils have subsequently reduced the necessary time from 35 to 40%. The new product, which will be marketed under the trade name of Kelvitol, polymerizes in such a short time that it can be regarded as spontaneous.

The refining processes through which the oil is put imbue it with the ability to polymerize in approximately 20% of the time required for regular oil.

Although war-time conditions control the output of this new product, the manufacturers have been granted permission to distribute test quantities.

Absorbent Mineral NP 102

Super-Absorbit is a highly absorbent mineral used where liquid spillages occur. It is used on surfaces where oil, grease, water, syrup, chemicals, or any liquid is spilled. It is also successfully used for acid absorption. It does not become slippery or mat when saturated and is always sweepable.

Super-Absorbit will absorb 392.8 per cent of its weight of water or 315.62 per cent of oil. It is fireproof, dielectric, very light in weight and contains a minimum amount of abrasive.

Resin Glues For Wood NP 103

Two new resin glues have been developed by Synvar Corporation. These new resins, both of the phenol-formaldehyde type, are Synvaren CP-5 and Synvarite PCP. Synvaren CP-5 is a liquid, water-soluble resin; while Synvarite PCP is a resin with the same characteristics, in powder form, which can be easily dissolved in water or alcohol. The resin in liquid form has the advantage of a "ready to use" glue; while the powder resin has the advantage of a longer storage life. These resins can be used for soft or hard plywood bonding at high temperatures when a very short curing cycle is required, without addition of any hardener. They can be used with a special hardener, LS, for an intermediate temperature bonding of plywood, and for lamination work. A temperature as low as 150° F can be used in connection with these two resins.

Instruction sheets are available giving detailed data on the formulations and curing schedules.

Fire-Retardant Paint NP 104

A new Underwriters-approved paint which protects wood and other materials against fire hazard is announced by the General Detroit Corp. and the General Pacific Corp. Called Fi-Repel, it is endorsed by Underwriters' Laboratories and

other leading testing bureaus for protection of all interior combustible surfaces.

Fi-Repel is made for use in factories, warehouses, hangars, garages, schools, hospitals, hotels, homes, and wherever else fire protection is necessary. It is shipped as a concentrated paste which, after dilution, can be applied with a brush or spray gun to the surface to be protected. One concentrated gallon, at standard dilution, will cover as much as 185 square feet with two coats. Standard color is bone-white, but tints may be easily added.

Illustration shows ordinary physician's tongue depressor, one end of which is painted with Fi-Repel. The unpainted end burns freely, but the flame dies when it reaches the painted portion. Fi-Repel is available in gallon, 5-gallon, and 55-gallon containers.

Synthetic Medicinal NP 105

A new compound analogous to Synephrine under investigation in the laboratories of the Frederick Stearns & Co. Division of Sterling Drug, Inc., gives promise of providing relief to sufferers from hay fever and asthma.

In laboratory experiments the new compound proved more stable, more active than Synephrine, and with action that was not as transient. It is one of the sympathomimetics of the isopropyl group.

Rubber Emulsifier From Rosin NP 106

A newly developed resin emulsifier was announced recently by Hercules Powder Company.

Made by a special process from rosin, the Hercules rosin acid derivative is credited with imparting additional tack to the rubber, thereby improving its adhesive qualities.

Produced in the form of paste, the resin emulsifier is shipped by tank car to government polymer plants and pumped into storage tanks. It is then piped to the reactors where the polymerization of butadiene and styrene takes place.

Ammonium Thioglycolate NP 107

Commercial production of ammonium thioglycolate solutions in concentrations of 40-55% was announced recently by the Special Chemicals Division of Winthrop Chemical Company, Inc., which has been producing thioglycolic acid for some time.

Pickling Inhibitor NP 108

An organic acid pickling inhibitor in powdered form, designated Pennsalt PM-40, has recently been developed by the Pennsylvania Salt Manufacturing Company. This material is highly stable and is completely soluble in pickling baths of either hydrochloric or sulfuric acid. It contains 100% active ingredients and is highly effective at as low concentrations as 0.02% to 0.10% by weight of the pickling bath. This material effects economies in both acid and metal, while minimum quantities of inhibitor are required; the acid is consumed principally in scale and rust removal with the result that the useful life of the bath is prolonged. Pennsalt PM-40 can be used in acid pickle baths prior to electroplating, galvanizing, and enameling since it is free-rinsing and minimizes hydrogen absorption.

Butanol From Pulp Liquor NP 109

A new and cheap source for butyl alcohol has been discovered in sulfite pulp liquor. The process has been evolved by Dr. Bror L. Grondal, professor of forest products, University of Washington, and Maj. Henry W. Berger, a Seattle consultant.

Butyl alcohol has been made synthetically or by the butanol-acetone fermen-

QUAKER IMPROVED CHLORINATED LIME

The exacting requirements of the Armed Forces have resulted in a new Chlorinated Lime. The Pennsylvania Salt Manufacturing Company now offers Quaker IMPROVED Chlorinated Lime which meets all the requirements of Chemical Warfare Service specification No. 197-54-281B, Grade 2. It comes in 700, 300 and 100 lb. drums. There is a limited quantity for civilian use. Prices available on request.

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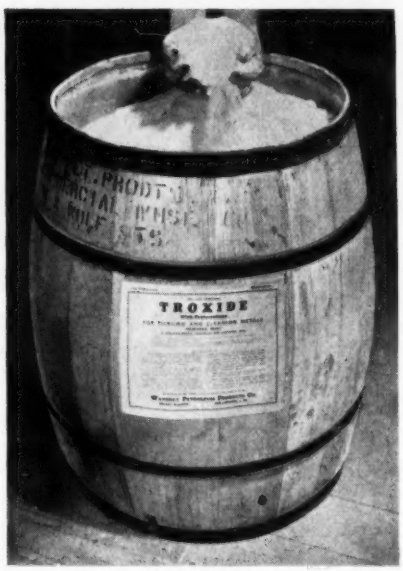
tation, but the inventors expect the new process to provide cheaper material for plastics and synthetic rubber.

Pickling Agent NP 110

A new pickling agent to remove rust, scale, tarnish, and incrustations of cement and lime from metals is being marketed by Waverly Petroleum Products Co. Troxide, as this new chemical is named, is a dry, inert compound. It is non-eruptive, non-inflammable, and is said to present none of the occupational hazards common to acids heretofore used in pickling.

Unlike the conventional acid pickling-solutions, it is claimed that Troxide throws off no "acid-mist" or other toxic



fumes. It is further stated that it may be used either hot or cold, and lasts many times longer than the conventional acid pickling-solutions.

By packing it in ordinary wooden barrels, the manufacturers emphasize the claim that Troxide presents no occupational hazards.

Ammonium Chloride and Sodium Sulfite by Double Decomposition NP 111

Canadian Industries, Ltd. (I.C.I.-du Pont), has recently revealed details of the process developed by its research and development department for the manufacture of ammonium chloride and sodium sulfite by the double decomposition of ammonium sulfite and sodium chloride. Although this method of production has been utilized by C.I.L. in its Hamilton, Ont., plant for several years, the only information available previously was the brief outline reported in CHEMICAL INDUSTRIES in August, 1944.

Based on extensive phase rule studies, the process consists essentially of mixing equivalent quantities of salt, sulfur dioxide, and anhydrous ammonia in water, and allowing the reaction to reach equilibrium

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at 60 deg. C. Sodium sulfite separates at this temperature and the remaining solution is cooled to 20 deg. C., at which the ammonium chloride precipitates, and the cycle may then be repeated.

The sodium sulfite leaving the reactor is said to be almost 100 per cent pure, but after drying, as a result of the ease with which wet sodium sulfite oxidizes, analyzes 96.5 per cent sulfite, with the difference mainly sulfate and traces of ammonium and sodium chlorides. The ammonium chloride produced analyzes 99.85 per cent pure on a dry basis, with traces of ammonium and sodium sulfates.

Secondary processes were subsequently worked out for the conversion of sodium sulfite to sodium thiosulfate and sodium metabisulfate, and for the manufacture of galvanizers' sal ammoniac and zinc ammonium chloride from the ammonium chloride yield.

Synthesis of Sulfanilylthiourea NP 112

Investigations conducted at the laboratories of Mallinckrodt Chemical Works, Ltd., on methods of synthesizing sulfanilylthiourea and kindred sulfa chemicals, include some interesting and reportedly novel observations on this subject.

A number of routes to the synthesis of sulfanilylthiourea were investigated, but the most promising appears to be via the preparation of acetylsulfanilylthiourea, with subsequent deacetylation.

The synthesis of acetylsulfanilylthiourea was carried out by the addition of hydrogen sulfide to acetytylsulfanilylcyanamide, for it was noted that just as cyanamide reacts with hydrogen sulfide to produce thiourea, with water to produce urea, and with ammonia to produce guanidine, so does acetylsulfanilylcyanamide react with these reagents to give acetylsulfanilylthiourea, acetylsulfanilylurea, and acetylsulfaguanidine, respectively.

The formation of acetylsulfanilylthiourea proceeded smoothly and in good yield, when a suspension of calcium acetylsulfanilylcyanamide was heated with a saturated solution of hydrogen sulfide in water at 100 deg. C. Similarly, sulfanilylthiourea was formed when sulfanilylcyanamide was heated with ammonium sulfide solution in a sealed tube, at 160 deg. C., for one hour.

The sodium salt of acetylsulfanilylthiourea yielded acetylsulfathiazole when heated in water with 1,2-dichloroethyl acetate, and the calcium salt of acetylsulfanilylcyanamide heated with a concentrated solution of ammonium chloride in a closed tube gave acetylsulfaguanidine. When sulfanilylcyanamide and concentrated ammonia were heated together, sulfaguanidine was obtained.

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Please send me more information, if available, on the following items. I understand that none may be available on some of them.

NP 101	NP 105	NP 109	NP 113
NP 102	NP 106	NP 110	NP 114
NP 103	NP 107	NP 111	NP 115
NP 104	NP 108	NP 112	NP 116

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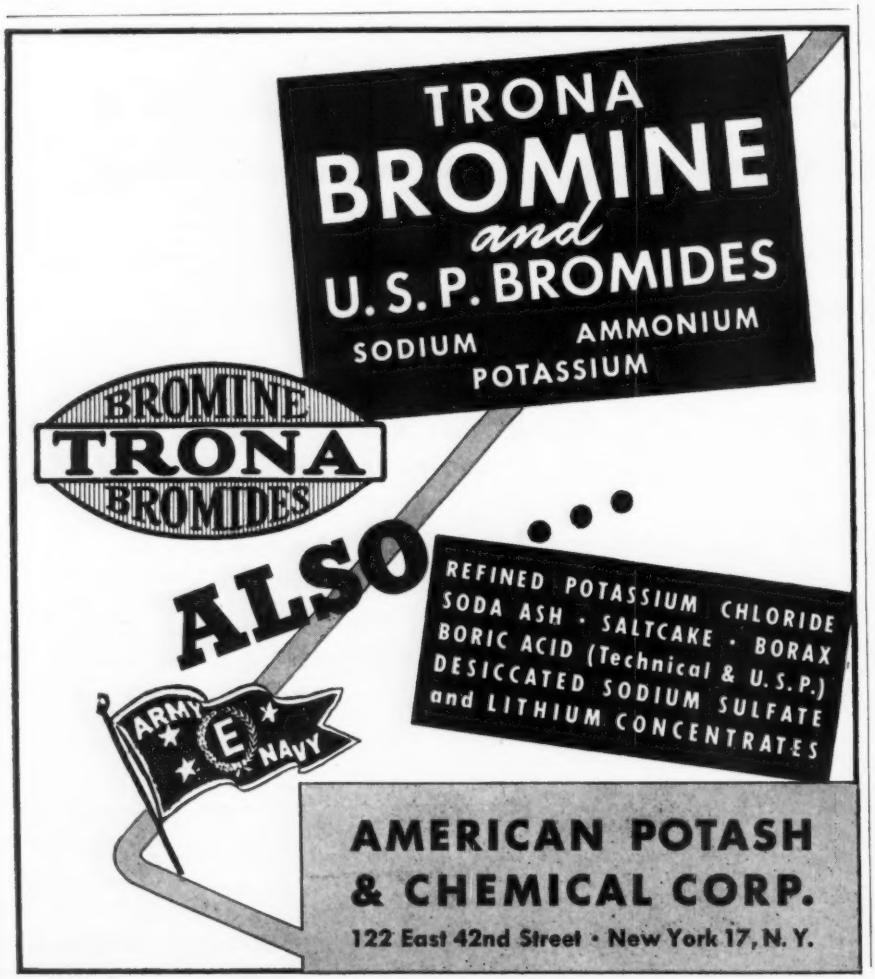
Company .....

Street .....

City & State .....



Molding Powder NP 113

The development of a new improved Dipex, a molding compound, for use in production of surgical goods in natural and synthetic rubbers, was announced today by Stanco, Inc. After wartime restrictions are lifted, the improved compound offers possibilities for use in the molding of light colored articles.

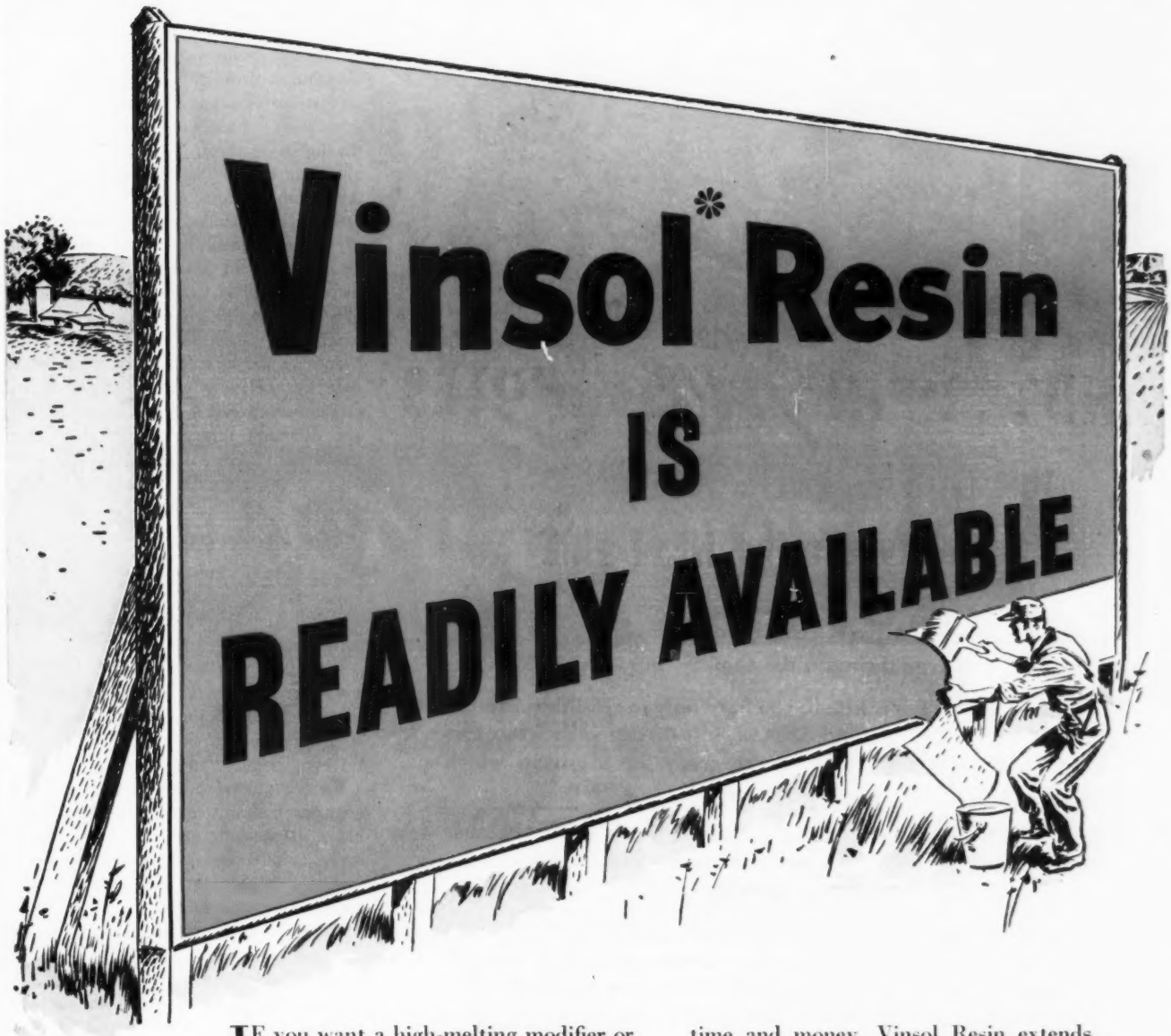
A similar product in dark color has long been marketed by Stanco, Inc., for use in molding of rubber, synthetic rubber and plastics. Its use was confined to molding of dark colored items, including vehicle tires of all types.

It gives clear, sharp designs. Dipex (Improved) is freely soluble in water and may be applied in solution by spraying, brushing or dipping.

Styrene from Still Residues NP 114

A novel catalytic process has been developed and patented in the United States by Dominion Tar and Chemical Co., Ltd., Montreal, for the production of styrene, nuclear substituted styrenes, and kindred products by the decomposition of diaryl ethanes, produced synthetically or derived from benzol still residues.

Based on the observation that benzol



IF you want a high-melting modifier or extender that is compatible with most natural or synthetic plastic resins—and *immediately available*—specify Vinsol Resin!* Supplies of this dark-colored thermoplastic are now plentiful, and the cost is but 2½ to 3½ cents per pound delivered!

Vinsol Resin conserves critical molding and laminating materials, while saving time and money. Vinsol Resin extends shellac and phenolics for compression-molding, and is useful in cold-molded plastics. It is miscible with glycerols. It improves flow of lignin plastics.

Test Vinsol Resin and prove for yourself its savings in time, money, materials. Coupon brings a generous test sample and detailed properties.

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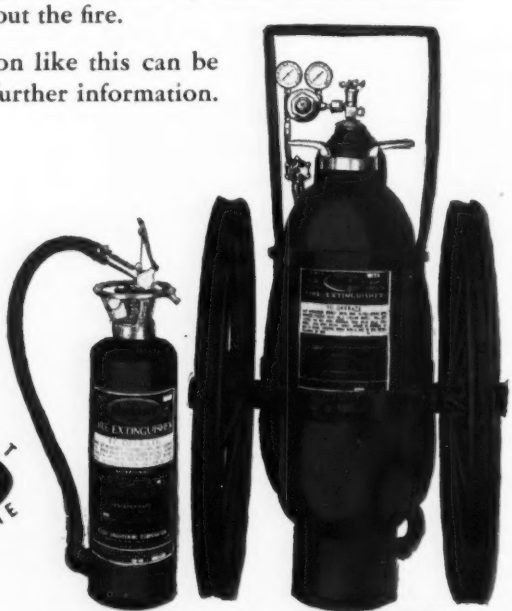

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still residues contain phenyl aryl ethanes, such as xylyl ethane, the Dominion Tar method consists essentially of the simple molecular decomposition of such diaryl substituted paraffins by closely controlled circulation of vapors of hydrocarbon oils containing such substituted paraffins through a converter, packed with hydrated aluminum silicate as a catalyst, at operating temperatures of 350° to 600° C. Other claims, embodying the employment of vapor diluents including water, benzene, and fiixed gases, cover methods of increasing yield, obtaining high-purity products, and prolonging the life of the catalyst.

Among the chemicals manufactured to date by this conveniently operated and economical process, apart from styrene, are *p*-methyl styrene, dimethyl styrene, chloro- and dichlorostyrene, and other vinyl compounds.

Skin Protectives NP 115

The Mine Safety Appliances Co., Pittsburgh 8, Pa., offer three new types of skin lotions and creams to guard the skin of workers.

Fend-U is a lotion designed to protect a worker's skin against all types of cutting oils and cooling compounds, kerosene, carbon tetrachloride, benzol, ether solvents, etc.

Fend-F, likewise a lotion, is said to help guard against dermatitis from aluminum, magnesium, and zinc dusts, and to form an effective barrier against Fiberglas, sharp particles, fruit and vegetable fuzz, chlorinated solvents.

Fend-PC is a cream for minimizing nervous perspiration where this is the cause of skin irritation, thus helping to prevent rusting of polished metal surfaces through contact with skin moisture.

Fermentation Byproducts as Penicillin Media NP 116

Research work conducted at MacDonald College, Quebec, by Dr. David Siminovitch, has indicated that byproducts of wheat fermentation, such as distillers' solubles and distillers' slops, serve as acceptable media for the production of penicillin by the submerged culture method.

A plate technique was developed to rapidly assess the value of as many farm products as possible as media for penicillin production, and it has been demonstrated, on a pilot plant scale, that distillers' solubles, when supplemented with lactose, is nearly as good a medium as corn steep liquor. Straight distillers' slops is equal to corn steep liquor.

With both media the penicillin yield is said to be about 15 units per c. c., in the tank, and 50-100 units in flasks, as tested against standards. It is thought that increased tank yields could be obtained by agitation of the medium.

PHOSPHATE ROCK

for Agricultural and Industrial Purposes

After four years of exploratory and development work in the Montana phosphate field, International has now started actual production at its new mine at Sherryl. A large production of high grade Phosphate Rock will be available from this operation as a raw material for agricultural and industrial phosphates. Inquiries are invited. By opening this new mine in the Montana field, International will increase its own Phosphate Rock production to meet the growing demands of domestic markets as well as requirements for export. Operating now in every major phosphate field in the country, International continues its thirty-five year leadership as the nation's largest producer of Phosphate Rock.

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NEW EQUIPMENT

Rotameter Tube QC 560

A new patented Rotameter tube made of boro-silicate glass that greatly simplifies rotameter construction is announced by Fischer and Porter Co. It is called the "Bead-Guide Tube" and has three straight glass ribs running up the inside of the tube to guide the rotameter float

throughout its travel. There is only a hair line contact between the float and each raised rib.

A guided float improves the accuracy of the rotameter by centering the float and it also prevents tube breakage. Furthermore, it permits float shapes that are not stable without guides, thus making possible the Stabl-Vis float of this company for measuring fluids of varying viscosity with high accuracy.

The "Bead-Guide Tube" simplifies rotameter construction because it eliminates the center guide wire previously used to stabilize the float. Also, it solves the problem of how to guide the float when very corrosive chemicals, such a hydrochloric acid, are being metered. The three ribs running up the rotameter tube also give it greatly increased strength.

Water-Service Packing QC 561

To meet the need for a general utility lubricated centrifugal pump packing, Greene, Tweed & Co. has developed Palmetto plaited packing. In this new packing, long-fibre asbestos yarn is used instead of cotton, with the advantage that the packing can be used for hot water as well as cold water. The lubricant is Palmetto Graphite grease which thoroughly impregnates every individual fibre of the packing. As a result, the packing is protected from water-logging and disintegration, and its service life is greatly prolonged.

The packing is plaited in square form, and is made in a wide range of sizes. Equipment for which this packing is recommended includes centrifugal pump shafts, reciprocating pump rods and plungers, valves, fire hydrants, and other apparatus handling hot or cold water.

Portable Pyrometer QC 562

A new portable pyrometer, weighing only 1¾ pounds, has been announced by the Instrument Division of the K. H. Huppert Company. It is particularly adapted to reading the temperature of molten metals (exclusive of ferrous metals), hot air or liquids and for hot surfaces, used with the prod type thermocouple.

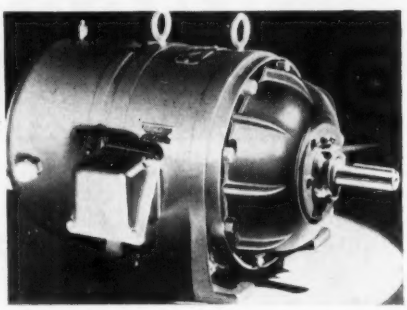
The body design of this new instrument elevates the scale to an agle that offers

maximum reading ease in all working positions, minimizing side reflections on the scale glass. This unusual shape further lessens the danger of scale glass coming in contact with other objects when the instrument is placed in any resting position, reducing glass breakage.

Instrument movement is of high quality, providing accuracy of reading to 2% of scale range. Manual room temperature adjustment can be made by the zero adjustment screw on the face of the meter. The sturdy six inch handle permits a firm, comfortable grip and the exceptionally light weight of the instrument reduces wrist and arm fatigue to a minimum.

Explosion-Proof Motor QC 563

A new Class I, Group C, explosion-proof motor, for atmospheres containing ethyl-ether and similar vapors, has been announced by the Motor Division of the General Electric Company. The new



motor was tested and listed by the Underwriters' Laboratories in July, 1944. Recommended for use in chemical plants, hospitals, and research laboratories.

It is available in frame sizes 204-326, and in Types K (normal torque) and KG (high-starting-torque), and is rated ¼ hp at 600 rpm to 20 hp at 3600 rpm, 110, 208, 220/440, 550 volts, 60, 50, 25 cycles. The construction is essentially the same as the Class I, Group D motors, but a special flamepath is used at the shaft openings to cool the flame of internal explosions. Thermostats operate in conjunction with a magnetic controller to disconnect the motor at a predetermined temperature, but do not supplant regular overload relays.

Other features of this motor include a cast-iron stator, a four-position cast-iron conduit box, and strong end shields of high-grade, corrosion-resistant cast iron with reinforcing cooling ribs. Effective cooling is provided by a nonsparking fan, and a convenient pressure-relief system provides for ease of lubrication without disassembly of the motor.

Dust Collector QC 564

The new Tubular Dustex dust collector has proven that it can collect and retain any type of dust or lints with perfect efficiency. Developed and manufactured by the Dust Filter Company, the collector comes in three sizes. All of these are portable and self-contained and designed

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Please send me more detailed information on the following new equipment.

QC 560	QC 563	QC 566	QC 569	QC 572
QC 561	QC 564	QC 567	QC 570	QC 573
QC 562	QC 565	QC 568	QC 571	

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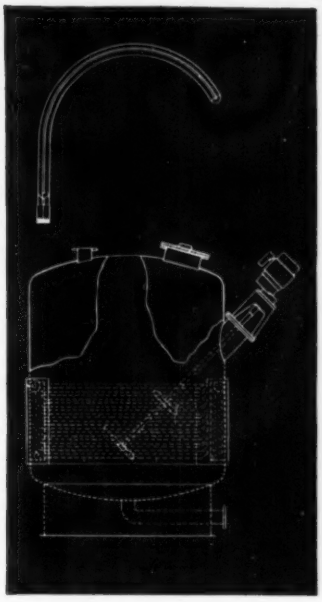

A.S.M.E. or A.P.I. inspections are tough—not unfair but insistent upon "safety" in the design of pressure vessels and rightly so because human beings as well as property are involved. So study your codes. With kettles, for example, watch that you do not locate openings or supports on or too close to a head knuckle. Set nozzles and mixer shaft stuffing boxes so that they are easy to service. In other words make them accessible.

In our many years of service to industry designing and making pressure vessels... and in helping users design their own units...we find that too much attention cannot be given to these details.

If you have started on the design of the pressure vessels you need, why not let one of our engineers check for possible conflictions? If you are only in the "planning" stage, why not let us take over the design? We know pressure vessel codes and how to meet them and yet at the same time produce the unit needed to take care of the desired processing.

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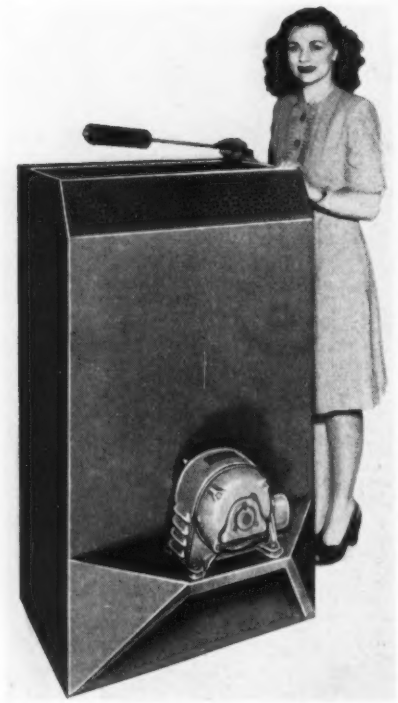
to meet the need for an efficient and economical means of removing any kind of dangerous and obnoxious dusts from the air. The unit is specially adaptable to the requirements of buffing, polishing and grinding machines.

The filter surface area of the tubular collector is increased twenty-fold over all standard units, the large unit containing 60.8 square feet of filter surface area. The immense surface area lessens the volume of air drawn through any portion of the filter at one time thus preventing minute particles from filtering through. It also diminishes the static pressure loss usually brought about by the impingement of the surface area by large quantities of dust.

No collector bags are used in the unit. The filter surfaces are tubular in design

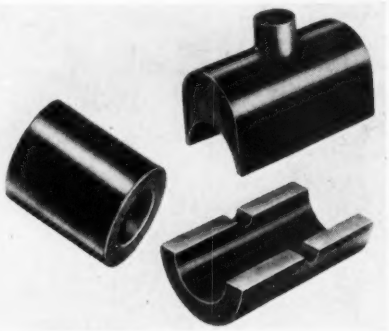


and are bottomless. Dust filtered through them is collected in a pan at the bottom of the unit. These are shaken periodically by a hand-shaker thus eliminating the necessity of opening the machine for cleaning purposes.

The collector maintains a static air pressure of more than 4 inches at a velocity of over 5,000 CFM. It is completely fireproofed. Units weigh from 150 to 250 pounds; are 36 to 48 inches high. Motors are A.C. ¾ and 1½ h.p. 3 phase, 60 cycle.

Self-Lubricating Bearings QC 565

In addition to compositions of carbon, graphite or both, the bearings produced by the Morganite Brush Co., are also supplied with various metallic contents for special applications. Bearings of these materials have unique properties—self-lubrication, immunity to acids, alkali and most solvents. They have low coefficients of friction and expansion, and wear is



negligible on the bearings as well as contacting surfaces. In operation, cooperating surfaces are glazed with a protective coating and as they impart no odor or taste to liquids they are widely used in chemical and food processing industries.

Morganite bearings are readily machineable and can be molded with tolerances to .001 inch. They can be machined to close accuracy when desired, or superfinished. Outside diameters of ⅛" to 15" are permissible. They may be supplied in any shape—complex sleeve or split types, with any contour required. They may be plated, take molded-in fastenings and can be shrunk, press fitted, or vulcanized to rubber.

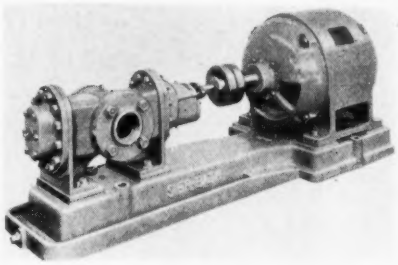
Operating speeds to 50,000 RPM with thrust loads to 30 PSI or loads to 2000 PSI at slower speeds are possible. Warpage and change of shape are practically non-existent. Because of inherent self-lubrication, they are widely used in inaccessible locations. Also, their immunity to high heat (to 850° F.) has resulted in wide use in steam turbines, drum dryers, and paper mills where ordinary lubrication usually is impaired.

Screw Pump QC 566

A new displacement pump of the screw type, suited to most heavy duty pumping, has been introduced by the Sier-Bath Gear Company. It will handle thick liquids of both the lubricating and non-lubricating type, such as asphalt, greases, soaps, syrups, etc.

As there is no pulsation or vibration in the flow from this pump, it is ideal for handling Bunker C Fuel Oil in burner operation. This feature also prevents the frequent loosening of piping that occurs from the impact of a pulsating flow.

Another feature of this pump is the extremely small amount of maintenance required. The internal gear types require only an occasional packing ring renewal which can be made while the pump is in service. The self-centering herringbone timing gears prevent sidewear of screws



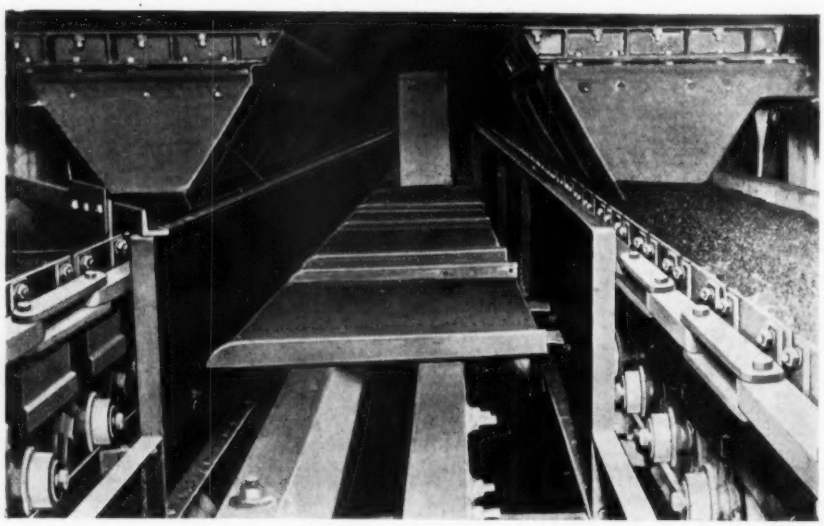
resulting from contact while pumping. The end to center flow of fluid in the horizontally mounted units eliminates thrust bearings.

Bucket Conveyor QC 567

An entirely new type of conveyor, known as the Link-Belt Sidekar-Karrier, designed to handle bulk materials in a horizontal run-around path, within minimum headroom, is announced by Link-Belt Company.

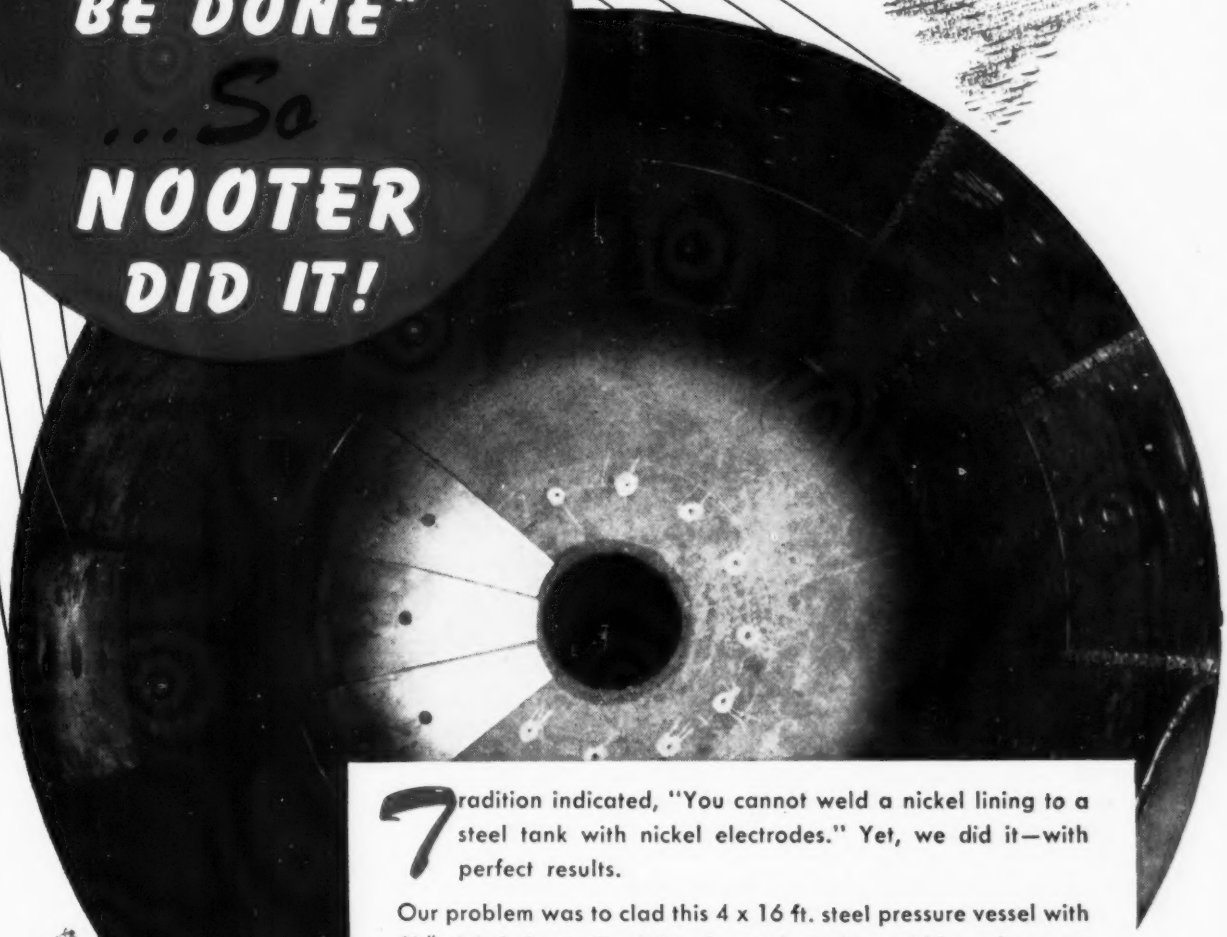
The new Karrier provides conveyor storage for materials that are to be discharged simultaneously in varying quantities at a number of points. Any surplus material that is still left in the conveyor buckets after they have served the several discharge points, will remain in the buckets, to be recirculated.

The conveyor is both (1) self-feeding



New bucket conveyor handles two or more materials without admixture.

TRADITION RULED "IT CAN'T BE DONE" ...So NOOTER DID IT!



Tradition indicated, "You cannot weld a nickel lining to a steel tank with nickel electrodes." Yet, we did it—with perfect results.

Our problem was to clad this 4 x 16 ft. steel pressure vessel with ⅛" nickel sheets. Traditional monel welds would have been attacked by corrosive reagents. Against the dictates of past experience, we engineered a technique of welding with nickel rods.

Later, each nickel panel was individually tested for leaks under air pressure between lining and steel—it worked!

Next time you need an "impossible" fabrication job—let Nooter do it.

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from any one of many feed spouts which may be located above its horizontal run-around path of travel, and (2) self-discharging to any number of points, thus permitting continuous automatic operation. Another feature is that the material is carried in buckets supported on rollers, rather than being dragged by flights in a trough.

The design is such that two or more materials can be separately fed to the conveyor with the assurance that the admixture will not be disturbed in transit, and that it will be delivered to any predetermined discharge point in exactly the same mixed proportions as prevailed at the feed points.

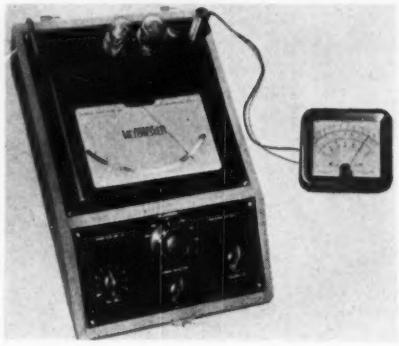
Sidekar-Karriers are available in two types, both of which are adapted to the efficient handling of other bulk materials besides coal. Handling magnesium pellets without degradation, for example, is being done with the Sidekar-Karrier.

Spats and Leggings QC 568

Protective leggings and spats of resistant coated fabric have been developed by Surety Rubber Co. Neoprene is used to impregnate and coat a lightweight, closely-woven cloth, producing a silver-colored material which defies acids, caustics, solvents, oils, fats, and greases. These spats and leggings are amply cut to cover the shoe all the way to the floor. A leather strap with buckle adjustment passes under shoe, and double-reinforced snap fasteners hold the cuff snugly. Two fastener positions accommodate the fullness of tucked-in pants leg. The legging has strap and snap fasteners, and a flexible metal stay is sewn in to hold the wrap-around at its full height of 14 inches.

Multi-Range Metertester QC 569

A result of four years' experience with production testing and calibration of DC instruments, the new Marion multi-range Metertester has been announced by the



Marion Electrical Instrument Company. It is designed with many operational features to improve the speed of meter inspection and with sufficient accuracy to permit its use in any department and all laboratories where meter performance must be carefully checked.

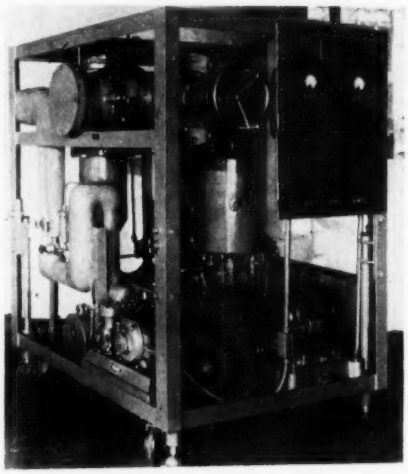
A multi-range instrument with self-contained regulated power supply and control equipment for use on 110 volts AC current, 60 cycles, the Metertester is composed of a stepless vacuum tube voltage control; a large 8½" mirror scale standard instrument and a decade of .1% accurate wire wound resistors. The range of the Marion unit is 25 microamperes full scale, to 10 milliamperes full scale and 0-100 volts full scale.

With an overall accuracy better than ½ of 1%, the Metertester is hand-calibrated by the Potentiometer Standard Cell method, on equipment certified by the Bureau of Standards. The instrument has a basic sensitivity of 10 milliamperes.

High Vacuum Pumping System QC 570

A new complete package-type high vacuum system, Type PS, in a small compact unit for direct connection to system to be evacuated, has been announced by the National Research Corporation. It will supplement the company's line of diffusion pumps, special high vacuum valves, manifolds, and gauges.

The units are available in several capacities and ultimate degrees of evacuation. They consist of a mechanical forepump, diffusion pump, high vacuum valves,



gauges, and a control panel. Mechanically refrigerated traps can be built in on special order.

The PS systems are simple to operate and eliminate the necessity of setting up high vacuum pumping systems and one connection only is necessary. The unit is fully automatic, vacuum conditions being indicated continuously on the control panel. The unit mounting is of rigid construction and may be mounted on casters for portability.

Hermetically Sealed Instruments QC 571

True hermetic sealing of electrical indicating instruments has been achieved by the Marion Electrical Instrument Company in their type HM 2 and type HM 3 meters. This sealing has been achieved by building the mechanism into a protective cup-like frame, and then sealing the

SUPPLIERS SINCE 1838

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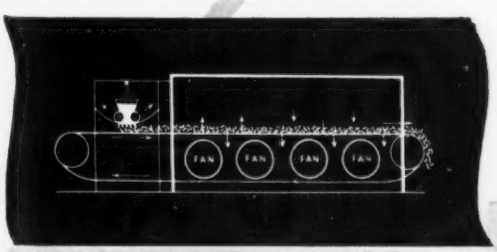
PROCTOR DRYERS for the PROCESS INDUSTRIES

Working closely with chemical engineers, Proctor research men and design engineers have not only kept pace with the rapid progress made in the chemical process industries during the past 25 years, but have actually set the pace in some instances.

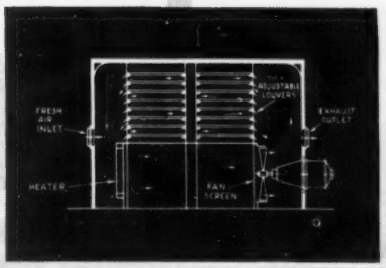
For example, for tonnage production of wet-solid and plastic materials there is the Proctor Aero-Form Drying system with the various pre-forming feeding devices. In each of the several types of Aero-Form Dryers, the material to be dried is first formed into the most ideal shape for continuous conveyor drying. It is then carried through the drying cycle, loaded to a uniform depth on a constantly moving conveyor. This system forms the ideal link between preliminary and subsequent processing. High production and uniform drying result.

Where capacities are not so high it is often found that a Proctor "Through-Circulation" Tray Dryer, a Proctor Truck Dryer or a standard Proctor Tray Dryer fills the need.

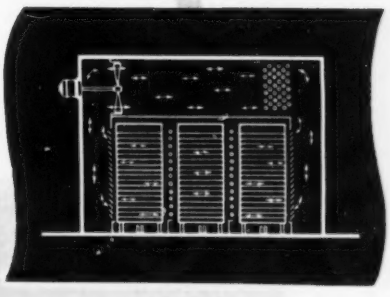
From the smallest laboratory dryer, handling a few pounds per hour—up to the huge continuous conveyor systems—Proctor Dryers are individually designed to meet production requirements. If drying is a part of your production process—regardless of the nature of your product or the capacity requirements of your plant—Proctor engineers can help you determine the best type of equipment to meet your needs.



Proctor Aero-Form Dryer with Rolling Extruder Feed. Other pre-forming feeds are Fin Drum and Granulator, each designed for products with particular characteristics.



Standard Proctor Tray Dryer. Built in various sizes depending upon individual needs.



Proctor Truck Dryer. Capacity larger than tray dryer—but not equal to continuous system.

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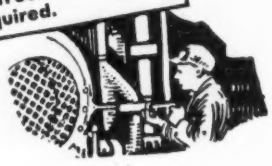

An Elementary Treatise on Equipment for the Process Industries

by E. RAYMOND RIEGEL

Professor of Industrial Chemistry, University of Buffalo,
Author of "Industrial Chemistry"

Practical—Comprehensive—Authentic—this book is the result of hundreds of inquiries from educational institutions and from all branches of industry. It is designed especially for the needs of students of chemical and industrial engineering.

From Screens to Heat Exchangers, from bucket elevators to potentiometers, each of the major types of equipment used in the chemical and process industries is described in detail. Specifications and latest available prices are included wherever possible.

Diagrams, Photographs, and Tabular Data accompany almost every description, making the construction and operation of each machine readily understandable to students and laymen as well as to engineers.

Classification of Equipment by function gives the discussion a natural and logical organization which will appeal both to students and to those who are interested primarily in obtaining the machine best suited for their particular requirements.

Contents include:

Factors in Plant Location; Devices for the Reduction in Size of Materials; Screening and Grading Equipment including Electro Magnetic Separators; Conveying and Elevating Equipment; Tanks; Transferring and Elevating Liquids—Pumps, Blowcases; Weighing and Proportioning Solids, Liquids; Propelling of Gases; Coolers of Gases, Gas Absorbers, Gas Washers, Condensers, Solvent Recovery, Dust Collectors, Bag Filters, including Spray Nozzles; Mixing Devices; Stirring Agitation; Mixing and Blending Equipment for Solids, for Pastes, for Powders; Separation of Solids from Liquids; Evaporators; Crystallizers; Driers; Distilling and Fractionating Equipment; Vacuum Producing Equipment; Condensers, Steam Jet Ejectors, Vacuum Pumps; Heat Exchangers; Application of Heat and Cold; Heat Transfer Agents, Kettles, Refrigerants; Gas Conditioning; Hydraulic Pressure Equipment; Extreme High Pressure Equipment; Instruments.

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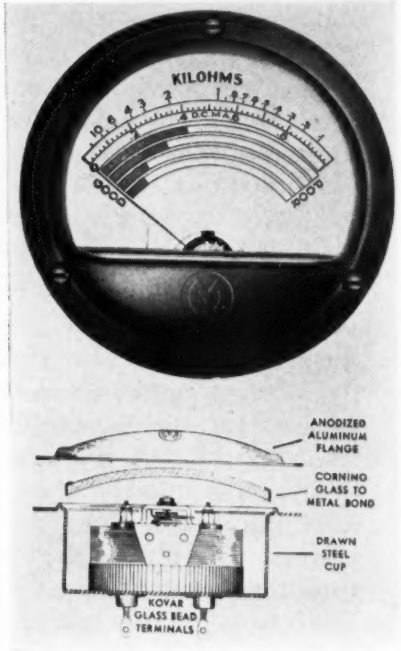
glass cover to the metal rim by applying the principles of vacuum tube sealing. There are no rubber gaskets or cement seals. The Marion instruments can be immersed in boiling brine solution for weeks, or frozen to —40° F., without deterioration of the seals.

The window sealing process was developed and perfected in cooperation with the engineers of the Corning Glass Company.

Windows are of double thickness tempered glass, processed for solder sealing, and are highly resistant to shock. Completely dehydrated, the instruments are filled with dry air at sea level pressure. A newly designed crowned crystal permits



greater scale length, reduces shadows and makes for better visibility and magnetic shielding makes possible interchangeability on any type of panel without affecting calibration. For extra R. F. shielding, the instrument can be supplied silver plated.

Silver clad beryllium copper hair springs reduce zero shift at all temperatures. The standard Kovar glass bead type terminals with solder lugs and the special phosphate finish on the case are among the features incorporated in the new Marion instruments, which are built to A. W. S. standards and are available in all DC ranges.

Air-Cooled Heat Exchanger QC 572

A new air-cooled heat exchanger has been announced by the Alco Products Division of the American Locomotive Co.

In operation a positive predetermined air flow in a direction remote from the air inlet, to assure that none of the hot gases are recycled, is induced by means of a motor-driven fan located on the top deck. This induced updraft operation obviates the uncertainties of changing winds

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For fire safety, call in a Kidde representative—he'll be glad to discuss your fire protection problems. Check the accompanying list of typical industrial hazard areas. One may apply to you.

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ELECTRICAL CONTROL PANELS

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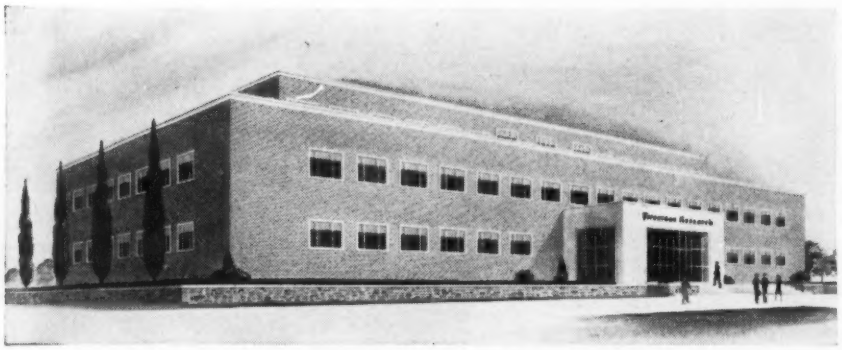
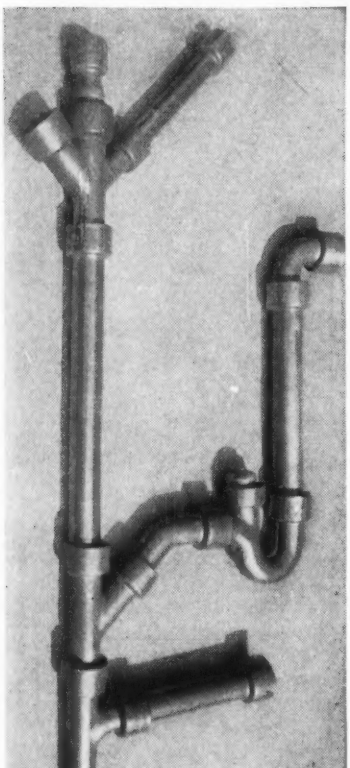


Modern Laboratories Are Knight-Ware Equipped



Above is the modern new research laboratory of the Firestone Tire & Rubber Company in Akron, Ohio. It is a model of completeness both in its modern construction and equipment. The acid-proof pipe and fittings for this new Firestone structure were supplied by Maurice A. Knight.

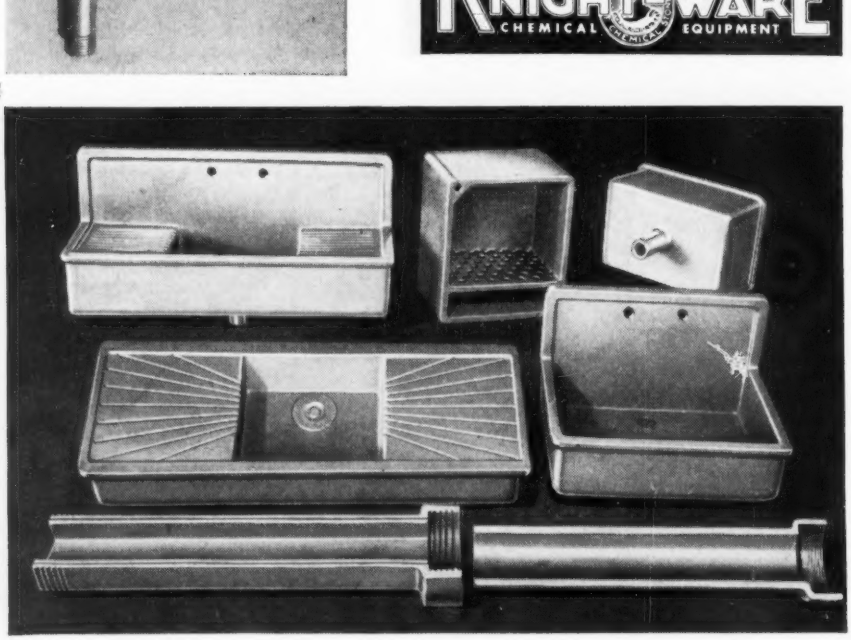
Many of the country's modern laboratories have KNIGHT-WARE Laboratory Equipment, much of it custom built. This equipment includes sinks of many sizes and shapes with back, drainboard, apron and outlet in one solid piece. There are also table troughs, receptors and neutralizing sumps.

These units, together with acid-proof fume ducts and drain lines, will give you a maintenance-free laboratory. For further details, write for the Knight-Ware Laboratory Equipment catalog.

MAURICE A. KNIGHT

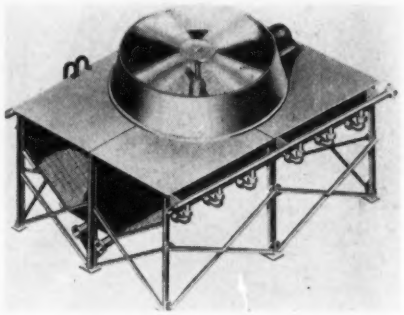
206 Kelly Ave., Akron 9, Ohio

KNIGHT-WARE CHEMICAL EQUIPMENT



and assures uniform air distribution over the heat transfer surface. The fan, motor and mechanical drives are readily accessible for inspection, lubrication and servicing. The same type of heat transfer surface that has been in use on Alco locomotives for many years is utilized.

The exchanger comes in four standard



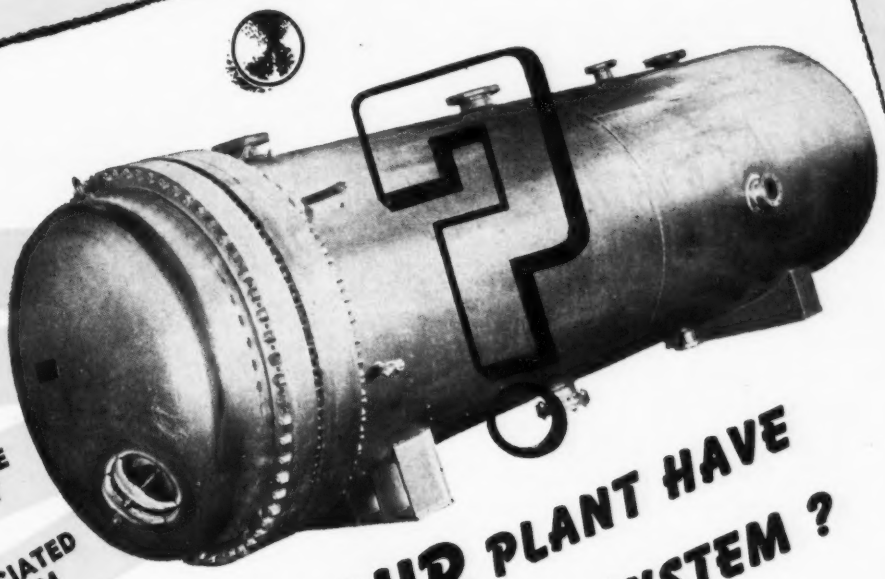
sizes and the heat transfer surface can be combined or subdivided in a manner that will allow the simultaneous cooling of lubricating oil, water, and gas in the same unit.

Jet Agitator QC 573

A new type jet, which utilizes, steam, air, or solution to thoroughly agitate and circulate solutions in tanks and vats, is now being built by The Youngstown Welding and Engineering Company. After success in pickling tank installations, it was found that the Weldco Steam Jet has many other practical applications in the food and process industries, as it became apparent that air and liquid as well as steam could easily flow through the patented bell-shaped jet to agitate and circulate solutions in vats, tanks, and other containers.

The Weldco jet is easily installed in

the corner or anywhere along the sides of a tank by simply connecting it to the present line; no special piping or additional lines are necessary. The velocity of the air, liquid, or steam increases as it passes through the special nozzle and expands into the bell-shaped housing of the jet, sucking solution from the tank through the back of the jet, agitating and circulating the solution at the side and back of the jet as well as the solution in all other parts of the tank.



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Operating conditions, steam demands, quality of raw water supply and plant heat balance—all are factors in determining the advisability of an evaporator installation. These factors are distinctive in each plant and require individual study. Griscom-Russell brings to such a study the accumulated experience of 77 years of pioneering in the development and application of evaporator systems, and the results obtained in many hundreds of evaporator installations.

These are some of the reasons why Griscom-Russell recommendations are authoritative, and why you can depend upon their advice as to the advisability of an evaporator system for your particular plant conditions. Write for complete information, without obligation.

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PACKAGING & SHIPPING

by T. PAT CALLAHAN

Future Packaging of Chemicals

WITH the passing of V-E Day, much is in store for the chemical industry in planning future requirements of containers. The continued shortages of nearly all container materials, which up to now have not been lessened, will continue for some time to come; and it will be well for industry to plan very far in advance until conditions become more normalized.

T. Pat Callahan

Much consideration must be given, however, in evaluating the substitute packages adopted when it became essential to make quick changes in chemical packaging. Many of these substitutes will have to be replaced, but a considerable number of them will continue. From all the development made necessary by the exactions of war needs, many containers hitherto not considered satisfactory for the shipment of chemicals have demonstrated their worth and have proved more suitable than those formerly used.

Especially have the treated fibre board containers, referred to as V-Board, met most excruciating services in war shipping under most exacting conditions of handling and weather; the use of this material will most likely find its place in chemical packaging.

Moisture-vapor proof agencies of resins, foils, and many other materials, which by war necessity have been used only in the most necessary war packaging, will be used for civilian packages, and these offer a very definite answer to the problem of protection. Not only as a protection against moisture will these special materials be used but by their nature will they prove impervious to many chemicals, thus preventing contamination of product. This, as we all know, will be a big factor in postwar packaging.

The tremendous use of multiwall paper bags in the chemical business, as occasioned by the need of conservation of more critical materials, has demonstrated an economical and safe method of handling and shipping large volumes of dry chemicals. It is a well established fact that bags produced in the postwar period will in every respect be superior to those now being used. This is due to the extensive research which has been carried on by the various manufacturers of paper bags in cooperation with the chemical industry and other industries in an endeavor to get the best treatment for paper. This research has resulted in an extension of serviceability and also in the development of various interior linings which will prove impervious to many chemicals not shipped in paper heretofore. As an example, the treatment imparting wet strength to paper will increase its capacity to withstand severe handling and weather conditions. We have all seen advertisements of multiwall bags being thrown into the water at some far-flung outpost. This has been made necessary by the exigencies of war conditions. Bags which will withstand the terrific abuse which has been given them in war transportation will definitely find a place in postwar use, even though the requirements will be as severe as those created by conditions which are familiar to us all.

Metal packages which have been most widely used and which, through the continued shortages have had to be reused, have demonstrated most formidably the effectiveness of metal in the shipment of chemicals, and much is in store for the chemical industry when stainless steel, aluminum, and nickel become available for use again. Increased production due to the war of the various metals will, we feel, prompt the manufacturers of these materials to develop uses in the postwar period for containers applicable to the chemical industry for the huge output which will continue after the war. The chemical industry should benefit greatly from this, and it is expected that containers manufactured from these various metals will find a ready market.

Packaging of chemicals will take on added impetus after the war because of all which has been learned since the war started. Having been forced to change from established packaging, the industry has found many uses for packages which, until their necessity was created, were not considered satisfactory for packaging. It is hoped that the opportunities which lie ahead for the chemical industry will be eagerly grasped, as there is in the possession of all manufacturers improvements on old containers and developments on new containers which will greatly benefit all who are willing to take advantage of what is before them.

Impossible to Meet Steel Drum Quotas

The War Production Board on April 20 released the following statement regarding quotas established under Limitation Order L-197, and in view of the still critical shortage of metal drums, we think it advisable to quote this statement:

"In response to an inquiry by a committee member, WPB officials pointed out that quotas under the order merely limit the quantity of new drums a packer may use to the tonnage included within this quota. There is no assurance that the quantity of new drums will be available from any particular manufacturer, the officials said. Direct military orders placed with the drum producers must be given preference. The volume of such orders has increased materially and is absorbing the greater part of some manufacturers' entire production. New drum users experiencing difficulty in obtaining drums from their regular sources at the time required were urged by WPB officials to contact other suppliers until their usual supplier is again in a position to fill their needs.

"The situation concerning the supply of boxcars for shipping steel containers is still serious, industry members said, although it has shown some improvement in recent weeks. Shortages of boxcars have compelled some metal container manufacturers to slow down production, they told WPB officials. Some committee members mentioned their difficulties in obtaining cars suitable for transporting metal barrels.

"The availability of steel is the principal limiting factor in the steel drum and pail production program, committee members agreed."

From the above, nothing has changed at this writing and it is expected that the conditions stated will continue for some time to come.

Air Transportation Of Explosives

In February, 1944, at a meeting of the Civil Aeronautics Board in Washington, certain amendments to the Civil Air Regulations pertaining to the transportation of explosives and other dangerous articles were promulgated to take effect February 15, 1944. In December, 1944, the Civil Air Regulations were further amended concerning the shipment of explosives and other dangerous articles.

At a meeting of this Board held in Washington, D. C., on the 26th of April, 1945, an addition to the Civil Air Regulations was adopted to take effect July 1, 1945. This is known as Part 49 and due to the fact that there will be an increase

"Aye Mon, we Multiwalls are a thrifty lot!"

It's a fact, Multiwall Paper Bags are thrifty on three separate counts.

In Your Customers' Plants

1. These tight, siftproof bags deliver 100% of your product . . . eliminate siftage losses while helping to keep storerooms clean.
2. Multiwalls empty clean. Materials do not cling to their smooth interior walls. Retention losses are, therefore, greatly reduced.

In Your Plant

3. St. Regis Bag Packaging Systems speed up weighing, filling and closing operations . . . save manpower and cut down labor costs.

In addition, Multiwall Paper Bags are easy to handle. Results have shown that *one man* can load and stack Multiwall bags as fast as *two men* can handle equal tonnage in heavy fabric sacks or drums.

And, Multiwalls are plenty tough. Made of from 2 to 6 plies of sturdy kraft paper and specially treated sheets . . . designed to meet specific conditions involving excessive dampness, infestation and rough handling.

Get All the Facts

If you are not already using Multiwall Paper Bags, find out how they can help solve your packaging problems. Write for full information *today*.

St. Regis MULTIWALL PAPER BAGS

MULTIPLY PROTECTION • MULTIPLY SALEABILITY

ST. REGIS PAPER COMPANY

TAGGART CORPORATION

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Boston, Mass. Birmingham, Ala. Dallas, Texas Denver, Colo. No. Kansas City, Mo. Los Angeles, Calif. New Orleans, La. Franklin, Va. Seattle, Wash. Nazareth, Pa. Toledo, Ohio

in civil aviation, we deem it advisable to quote Part 49 of the Civil Air Regulations in its entirety:

"49.0 *General.* The following sections govern the carriage of explosives and other dangerous articles by any air carrier or non-air-carrier civil aircraft in the United States.

"49.1 *Definition of terms.* As used in this part, the following terms shall have the following meanings:

(a) 'Interstate Commerce Commission Regulations' shall mean the Interstate Commerce Commission's 'Regulations for Transportation of Explosives and Other Dangerous Articles by Land and Water in Rail Freight, Express, and Baggage Services, and by Motor Vehicle (Highway) and Water,' effective January 7, 1941 (49 CFR, Cum. Supp., Parts 71-85).

(b) The terms 'explosives' and 'other dangerous articles' shall mean any article or substance classed as 'Class A explosives,' 'Class B explosives,' 'Class C explosives,' 'Inflammable liquid,' 'Inflammable solid,' 'Oxidizing material,' 'Corrosive liquid,' 'Non-inflammable compressed gas,' 'Inflammable compressed gas,' 'Poison gas or liquid, Class A,' 'Poisonous liquid or solid, Class B,' or 'Tear gas, Class C,' in Part 2 of the Interstate Commerce Commission Regulations.

"49.2 *Acceptable explosives and other dangerous articles.* Civil aircraft may be operated in flight carrying acceptable explosives and other dangerous articles as follows:

(a) 'Acceptable explosives' designated in Part 5, section 654 of the Interstate Commerce Commission Regulations;

(b) 'Acceptable articles' designated in Part 6, section 703, of the Interstate Commerce Commission Regulations;

(c) Samples of lacquers, paints, and varnishes, having a flash point between 20° and 80° Fahrenheit, in quantities not exceeding one pint, when packed in friction top cans, the tops to be soldered or fastened by indentations in not less than six places, cans to be surrounded with sawdust or other material in sufficient quantity to absorb all of the liquid, and packed in substantial fibre boxes:

(d) Inflammable motion picture films when packed in accordance with the Interstate Commerce Commission Regulations, as amended to December 1, 1944.

"49.3 *Prohibited Articles.* No person shall operate a civil aircraft in flight carrying any article designated as a 'forbidden explosive' in Part 4, section 503, or as an explosive 'not accepted' in Part 5, section 653, or as an article 'not accepted' in Part 5, section 672, of the Interstate Commerce Commission Regulations or any other explosives and/or other dangerous article not designated in 49.2 of this part.

"49.4 *Certificate of Waiver.* The administrator may authorize the carriage of any of the articles prohibited by 43.411 or 49.3 or this chapter by issuing a waiver for such carriage: Provided, That no waiver shall be issued for the carriage of such articles by any aircraft carrying passengers for hire.

"49.5 *Packing and shipping precautions.* No person shall operate a civil aircraft in flight carrying explosives or other dangerous articles which are permitted by this part unless:

(a) Such explosives and other dangerous articles have been appropriately packed and marked in accordance with the Interstate Commerce Commission Regulations;

(b) Such explosives and other dangerous articles have been placed in a baggage compartment inaccessible to passengers during flight; and

(c) Such explosives, other dangerous articles, and other cargo carried in the same compartment have been firmly lashed to the aircraft structure or otherwise secured in such manner as to prevent shifting in flight.

"49.6 *Safety equipment and small arms ammunition.* Signaling devices, equipment necessary to promote safety in operation, and small arms ammunition in moderate quantities for personal use may be carried without complying with the provisions of 49.5 of this part.

"49.7 *Shipper's certificate.* The operator of a scheduled air carrier aircraft may rely on a certificate signed by an authorized agent of the shipper that a given shipment meets the requirements set forth in 49.2 of this part."

We wish to comment further that all persons who intend to ship any explosives or dangerous article should acquaint themselves with the provisions of these regulations and also acquaint themselves with the parts and sections of the Interstate Commerce Commission Regulations as referred to in this regulation.

Demurrage Charges Relaxed

Service Order 263, Demurrage Charges on Tank Cars, was amended by the Interstate Commerce Commission, effective April 17, 1945, modifying the demurrage charges originally covered by this order on tank cars which are held over the free time in case of strikes. The extraordinary demurrage charges which were placed on tank cars by this Service Order will not apply in the future when tank cars are held due to strikes.

This is of particular importance to shippers of chemicals if their tank cars are delayed due to the above cause.

Drums for Viscous And Solid Materials

No drum in the ICC 37 series may be constructed with a capacity above 55 gallons. In all the drums manufactured under this specification, with the exception of the ICC 37H, it is a requirement that the side seams be welded if the authorized gross weight exceeds 425 lbs. For all drums in this series, with the exception of the ICC 37H, the maximum authorized gross weight cannot exceed 880 lbs. For the ICC 37H, it cannot exceed 245 lbs.

The ICC 37D drum must be constructed of sheets of low carbon, open-hearth or electric steel; and, depending upon the authorized gross weight allowed, may be constructed from 24 gauge steel, permitting an authorized gross weight of 80 lbs., to 18 gauge steel, allowing an authorized gross weight of 880 lbs.

The test required for the complete ICC 37 series is the same as for the ICC 37D, and we quote this test in full:

> *"Type test:*—Samples, taken at random and closed as for use, shall withstand prescribed test without leakage. Test to be made of each type and size by each company starting production and to be repeated every four months. Sample last tested to be retained until further tests are made. The type test is as follows:
> "Test by dropping filled with dry, finely powdered material to the authorized gross weight, from height of 4 feet onto solid concrete so as to strike diagonally on top chime. Closing devices and other parts projecting beyond chime or rolling hoops must also be capable of withstanding this test."

The ICC 37E, ICC 37F, and ICC 37G drums must be constructed in the same manner as ICC 37D except that a lighter gauge steel may be used for similar authorized gross weights as follows: The gauge of steel required for the ICC 37E drum runs between 26 gauge and 20 gauge depending upon the authorized gross weights between 80 lbs. and 880 lbs.; the ICC 37F specification, between 26 and 22 gauge depending on the authorized gross weights between 80 lbs. and 880 lbs.; and the ICC 37G drum, between 28 and 24 gauge depending on the authorized gross weights between 80 lbs. and 880 lbs.

Try These

AMECCO CHEMICALS Now!

PAROIL 143

PAROIL 143 is a chlorinated paraffin wax containing about 43% combined chlorine. It is a honey colored non-volatile liquid, soluble in most organic solvents, including hydrocarbons, but insoluble in water. PAROIL 143 is compatible with most resins, plastics and synthetic rubbers, with the exception of the cellulose derivatives.

PAROIL 143 is widely employed as a plasticizer in protective coatings, inks, plastics, synthetic rubbers and coated fabrics. It also finds use in fire retardant compositions, as an additive in lubricants and as a chemical intermediate.

Write for a sample and further information.

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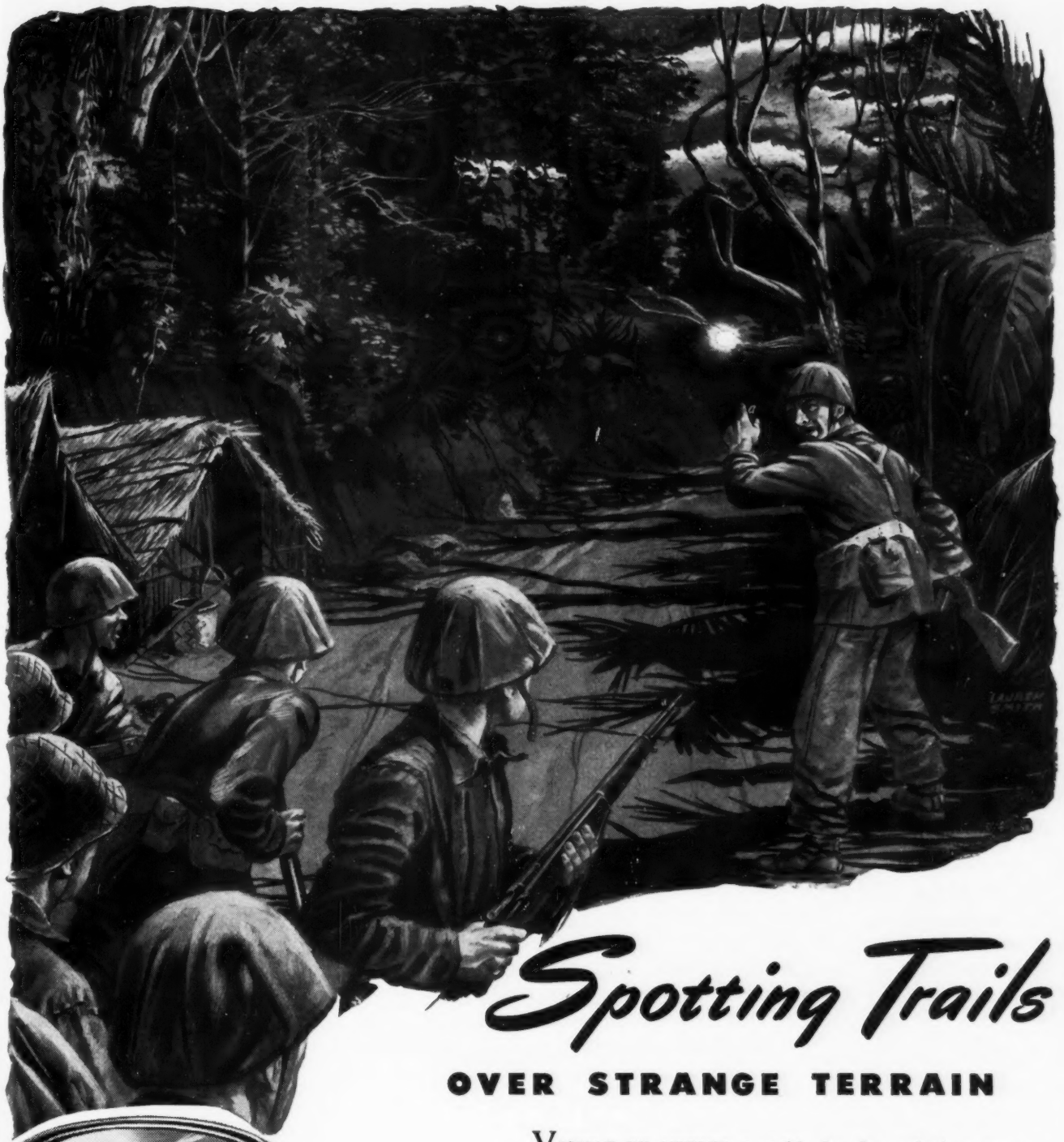

Spotting Trails

OVER STRANGE TERRAIN

VISIBLE BY NIGHT, invisible by day — that's a must for the land buoys planted to guide our armed forces at night through unknown country.

Markers coated with Vita Var Phosphorescent Paint, manufactured by Vita Var Corporation, Paint Engineers, Newark, N. J., fill the bill.

To assure efficient, economical packaging and complete protection for their product, the makers of Vita Var use Crown Cans.

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INDEPENDENT AND HELPFUL

CROWN CAN COMPANY • NEW YORK • PHILADELPHIA • DIVISION OF CROWN CORK AND SEAL COMPANY, BALTIMORE, MARYLAND

P-S-S-S-T!...

ARE BAD ODORS STEALING OFF WITH YOUR PROFITS?

. . . Are they lowering the efficiency of your personnel? . . . or actually depriving you of sales?

Bad odors can do that, and for years cause industry enormous loss without arousing suspicion of their insidious and sometimes unnecessary cost.

In our work with pleasant odors for the perfume trade we have discovered many unique applications for aromatic specialties, among these being the control or elimination of those unpleasant odors that tend to plague certain of our most important industries. This application of odoriferous principles as a means of reducing or neutralizing bad odors is already being applied or experimented with in such fields as the big, new synthetic rubber industry, in textile, glue and plastic manufacture, and in many others. It is a logical, intelligent approach to a problem that should be no more tolerated by modern industry than would the unsanitary plant conditions of a generation or two ago.

If your firm or industry is troubled by such a problem, why not confer with us as a first step toward finding an effective and economical solution? It will obligate you in no way to consult us.

FRITZSCHE BROTHERS, Inc.

PORT AUTHORITY COMMERCE BLDG., 76 NINTH AVENUE, NEW YORK 11, N.Y.

BRANCH STOCKS

BOSTON CHICAGO LOS ANGELES ST. LOUIS TORONTO, CANADA MEXICO, D. F.

FACTORIES AT CLIFTON, N. J. AND SEILLANS (VAR) FRANCE

The ICC 37H drum may be constructed of 28 to 22 gauge material, and the authorized gross weights run between 45 and 245 lbs. There are certain other requirements concerning the construction of the ICC 37H drum which differ from that permitted in the other drums of the ICC 37 series and these are quoted below:

"(a) Side seams and chimes must be welded or of Gordon or other equally efficient lock type.

"(b) Drums of 26 gauge head and body sheets with lap-welded body seams are also authorized for sizes 5 to 40 gallons with maximum authorized gross weight of 220 lbs.

"Closure required:—Adequate to prevent leakage; gasket required when necessary; to be of screw-thread type or secured by positive fastening. Filling opening over 9-inch diameter unauthorized, except when consisting of full removable head. Dustproof closure required. If closing device can not be opened and closed without reducing efficiency, container must, when specified on purchase order, be provided with supplementary opening for sampling at least 2 inches in diameter with closing device such that it can be opened and closed without reduction of efficiency."

The ICC 37 series of drums is used extensively in the chemical business, particularly for dry powders classed as poisons, viscous inflammable liquids, inflammable solids, and oxidizing materials. It must be borne in mind that in a great many cases shipment of hazardous materials in these categories require the ICC 37D drum. In a great many cases, the ICC 37D and ICC 37E may be allowed and the others may not be used. It is necessary to determine the particular hazard and consult the Official Regulations of the Interstate Commerce Commission to determine what specification containers are allowed. Compliance is obviously mandatory.

One thing to remember in the ICC 37 series of specifications is that there is no specification type of closure for full open head drums, the only requirement being that removable head containers which will pass all the required tests are authorized. There are a great many variations of closures for open head drums in this series, and it is well to be certain that they pass the required tests before using them with hazardous chemicals.

Limitation Order L-232

Limitation Order L-232 was amended on March 31, 1945. This amendment does not affect to any extent previous limitations on the use of wooden shipping containers as far as the chemical industry is concerned. The change in the amendment covers various phases of containers for fruits and vegetables.

ON CONSTANT GUARD

Against the enemies ...of your products

Will absorbed moisture—or evaporation—damage your packaged products? Is there possibility of your products absorbing foreign odors while in storage or in transit? Or of losing their natural, desirable aroma? Is sifting a problem? Or vermin? Or contamination?

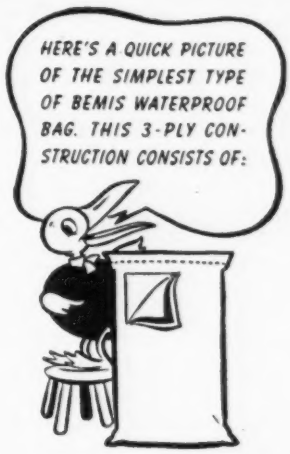
If the answer is "yes" to any of these questions, and if your products are in powdered, granular, crystal or lump form, then Bemis Waterproof Bags are just what the doctor ordered. They give full protection against all these enemies of your products.

How will you know what particular type of bag your products require?

That's one of the tasks of the Bemis Shipping Research Laboratory. With specially designed equipment, chemists and research specialists determine what bag materials and constructions should go into each job.

Almost as important as top protection for your products are the major money savings you enjoy. Bemis Waterproof Bags cost less than other containers giving comparable protection. Further, they save storage space on both empty and filled bags—they speed up filling, closing and handling time—they save on shipping costs—and frequently reduce damage claims.

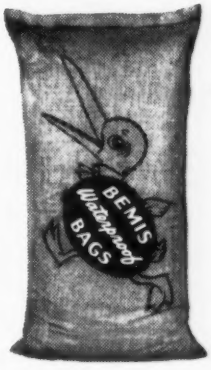
Send the coupon today for the interesting booklet—"A Guide to More Efficient Shipping." Then, if you wish, one of our representatives will call on you to discuss your packaging requirements. No obligation, of course.



1. An inside layer of flexible creped kraft paper impregnated with...
2. a layer of waterproof adhesive that also seals the interstices in the...
3. outside layer of tough, closely woven fabric and cements both layers together.

The outer fabric may be either cotton or burlap. The kind of bonding adhesive depends upon the commodity to be packed. One or more linings of paper and adhesive may be incorporated depending upon the protection needed. Bag seams may be cemented or sewn.

THEY'RE TAILOR-MADE TO YOUR JOB



WATERPROOF DEPARTMENT

BEMIS BRO. BAG CO.

ST. LOUIS · BROOKLYN

BEMIS BRO. BAG CO., 408-J Pine St., St. Louis 2, Mo.;
5122 Second Ave., Brooklyn, N. Y.

Please send your special booklet, "A Guide to More Efficient Shipping," and details about use of Bemis Waterproof Bags for_____
(PRODUCT)

*Firm Name*_____

*Street Address*_____

*City*_____ *State*_____

*Mark for the attention of*_____

PLANT OPERATIONS NOTEBOOK

Safety Evolution

In a talk at the Southeastern Motor Vehicle Fleet Supervisor's Training Course Amos E. Nayhart noted that the safety movement has gone through various stages since it first came to be recognized as an operating problem.

1. The first stage was called the *birdcage stage.* This was so designated because everything that could be guarded was surrounded with some sort of cage or baffle. The points of operation received careful attention. In some instances the guards were so cumbersome that it required an hour to remove a guard in order to make an adjustment which took only thirty seconds. A reduction of 10 per cent in employee accidents was the very best record shown by this system.

2. Next came what was known as the *horror stage.* This particular stage received its designation because of the horror pictures and posters which were used to try to scare the workers into being careful and thereby reducing accidents. It was soon revealed that this method was no good because no substantial reduction in accidents ever came about.

3. The *safety-talk stage* was the third distinct period in the safety movement. This group approach had some worthwhile effect but it was still not the answer, because the results proved it.

4. The fourth stage, and the one which is being tested at the present time, is that of *reaching the individual.* This idea is young but the results thus far have proved that it at least is a step in the right direction. By the proper selection and training of individuals, the basic causes of accidents are being attacked at their source.

Waterproof Coating

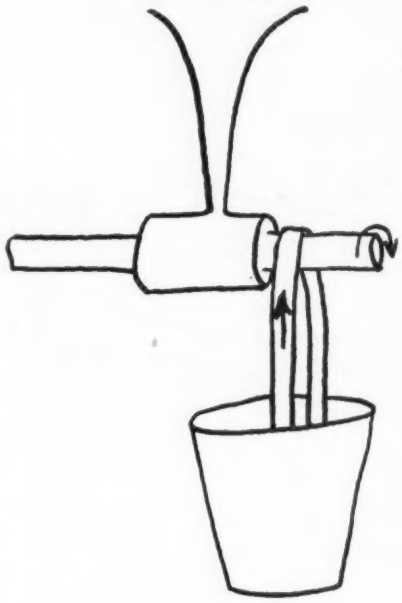
A recently developed waterproof coating called Liquinoleum, is said to have about eight times the protective thickness of paint. It is resilient and elastic and thus it is highly resistant to extremes of temperature. Even after long exposure it does not crack, blister, or alligator.

Liquinoleum is unaffected by acid fumes and many other corrosive chemicals. It does not crystallize on setting and flame from a blow torch will not cause it to catch fire, flow or run.

Water Cooling of Bearings

It would be advantageous at times to be able to keep a hot bearing going until quitting time. This can occasionally be accomplished by pouring cold water on it, but as this tends to contract the external sheath of the bearing promoting seizure of the shaft.

The accompanying sketch shows a better method which can be used under some conditions. An endless belt is placed on the shaft as close to the hot bearing as possible and allowed to hang down into a pail of water as shown. As the shaft rotates it causes the saturated belt to move upward onto the shaft, cooling the shaft and enabling it to absorb heat from the bearing. Any flexible belt that readily absorbs and carries water will serve.



Protection from Toxicity Of Solvent Vapors

All volatile organic solvents, including gasoline, benzene (benzol), naphtha, carbon tetrachloride, and trichlorethylene, give off toxic vapors. Hence, workers using any of these solvents in cleaning, degreasing, cementing and other operations must be protected from the effects of excessive amounts of their fumes.

According to the Safety Research Institute basic protection is provided by keeping the concentration of solvent vapors in the general atmosphere of the workroom below "the maximum allowable concentration (M.A.C.) for continuous exposure."

This limit, which represents the maximum concentration of solvent vapor to which workers may be continuously exposed during the eight-hour work day, has been established by the American Standards Association for several of the commonly used solvents, but in addition many states have standards of their own; limits varying from 50 parts of solvent vapor per million parts of air for benzene to 1,000 parts per million for petroleum products unmixed with more toxic substances. Solvent users can obtain M.A.C. tables from the Industrial Hygiene departments of their respective states, or, in states without such departments, from the U. S. Public Health Service, Washington, D. C.

Natural ventilation may suffice to provide this basic protection where the contamination of the atmosphere is slight, as where the solvent is being used in small quantities or is applied in equipment that prevents the escape of vapor. In other cases, it may be necessary to employ some form of mechanical ventilation, such as a local system which will draw off the vapors as they arise or strong general ventilation which will rapidly dilute the vapors to a safe level, as advised by a ventilating engineer.

Working conditions in a plant are probably satisfactory if the air is free from the pronounced odor of the solvent being used; but, since odor is not an adequate criterion, an atmospheric survey should be made. This requires the services of a competent chemist. In some states, such work is done by the State Industrial Hygiene Department on request.

However, even where the workers as a group are effectively protected by these measures, certain individuals may be endangered by the following practices:

Using solvents in poorly ventilataed areas, such as small rooms, basements, pits, etc.

Applying solvents in close proximity to the face, as in spotting garments or cleaning floors or machinery.

Working over open containers of solvents.

Handling products damp with solvents.

Opening containers or equipment holding solvents in such a manner that high concentrations of the vapor are inhaled.

Permitting drafts to blow high concentrations of solvent vapors in the direction of workers.

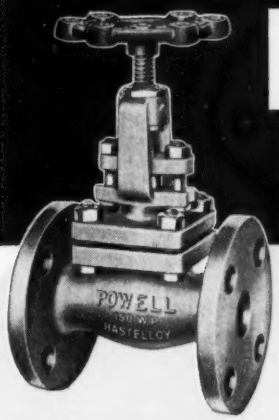
Allowing persons to work with solvents to which they are abnormally sensitive.

Entering tanks containing solvent vapors without proper respiratory protection.

It is not enough to prohibit such practices. Workers must also be educated to the dangers involved, and constant supervision must be maintained to prevent any one from taking chances.

When workers are unavoidably subjected to excessive concentrations of solvent vapors, they should be protected with suitable gas masks. Where the vapor concentrations are relatively low, canister-type masks approved for organic vapors by the U. S. Bureau of Mines may afford adequate protection; but, for high concentrations, as in vapor-filled tanks, air-line respirators must be employed.

HASTELLOY ALLOY VALVES_ *another* POWELL "First"



150-pound All-Hastelloy Alloy Globe Valve. ¼" to 3", incl.

All-Hastelloy Alloy Needle Globe Valve.

For almost 20 years Powell has been furnishing All-Hastelloy Alloy Valves as well as Hastelloy Alloy Trimmed Iron and Steel Valves.

Nearly two decades ago, the Special Alloy Valve Division of The Wm. Powell Company, anticipating the valve requirements of the rapidly growing Chemical, Process and Petroleum Industries, introduced the All-Hastelloy Alloy Valve and the Hastelloy Alloy Trimmed Iron and Steel Valve . . . *another "First"* in Powell's long list of "Firsts"

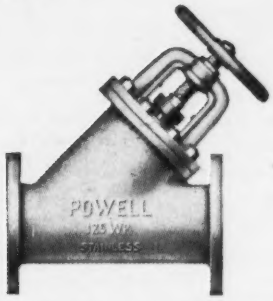
These Valves are made according to specially designed patterns to provide the best possible flow characteristics, considering foundry casting limitations. Powell Engineers early discovered that it isn't practical to cast Hastelloy Alloy valves using brass casting designs.

Today, Powell All-Hastelloy and Hastelloy Alloy Trimmed Valves are proving their superiority in the Nation's leading Petro-Chemical Plants and Refineries; in Isomerization Plants for the cracking of petroleum fractions in the presence of chloride catalysts; in Alkylation Plants; for cracking high sulphur crudes; and for handling sulphuric acid and hydrochloric acid . . . conclusive evidence of Powell's ability to design and fabricate valves to control the flow of highly corrosive and other media destructive to bronze, iron and steel. Write for complete, interesting details.

Powell "Y" Valves provide full flow, throttling control; and when equipped with the Patented Seat Wiping device, absolutely tight seating is assured at all times.

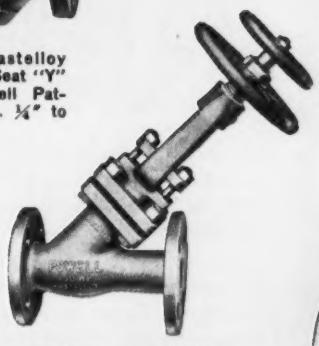
The Wm. Powell Co., Cincinnati 22, Ohio

150-pound Iron Globe Valve with Hastelloy Alloy Trim. ¼" to 2", inclusive.

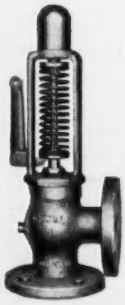


125-pound All-Hastelloy Alloy "Y" Valve. 2½" to 12", incl.

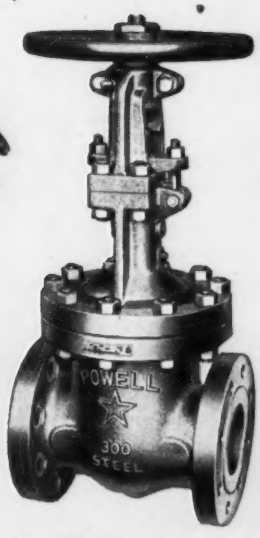
300-pound All-Hastelloy Alloy, Reversible Seat "Y" Valve, with Powell Patented Seat Wiper. ¼" to 4", inclusive.



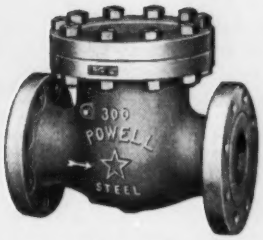
150-pound All-Hastelloy Alloy "Y" Valve, equipped with Powell Patented Seat Wiper. ¼" to 2", inclusive.



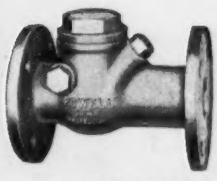
All-Hastelloy Alloy Angle Relief Valve ¼" to 4", inclusive.



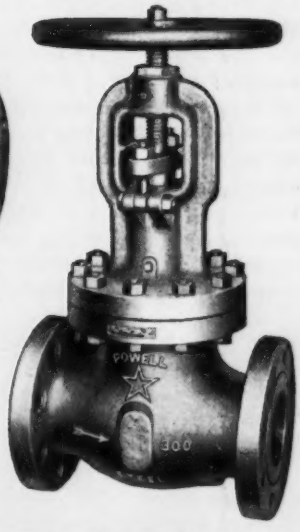
Class 300-pound Cast Carbon Steel Gate Valve with Hastelloy Alloy Trim.



Class 300-pound Cast Carbon Steel Swing Check Valve with Hastelloy Alloy Trim.



150-pound All-Hastelloy Alloy Swing Check Valve. ¼" to 2", incl.



Class 300-pound Cast Carbon Steel Globe Valve with Hastelloy Alloy Trim.

POWELL VALVES

LABORATORY NOTEBOOK

Laboratory Dryer

Bowen Research Corporation has developed a new laboratory spray-dryer which will fit on a table three feet wide and six feet long. A spray-dryer incorporating its features is ordinarily installed in a large specially constructed housing. Of the same general design and construction as the world's largest spray-drying plants, this unit is a carefully engineered

reduction of the large commercial equipment designed and patented by the above company, which claims that it is particularly useful in facilitating the valuation of the predrying steps in any new materials or processes that are being developed. It will reduce the time of experimentation and allow tests to be made at a minimum of expense. A quart or two of solution can be changed to dry powder form for examination in but a few minutes.

The unit is simple to operate and designed for easy laboratory cleaning. From one position the operator can observe and control the rate of feed, air inlet temperature, drying operation, air outlet temperature, condition of drying product and quantity of finished product. Literature is available for more detailed information.

Fluorescence Comparator

The Photovolt Optical Fluorescence Comparator, a product of the Photovolt Corporation, 95 Madison Ave., New York 16, N. Y., is designed for quantitative chemical analysis by fluorescence. It permits comparing the intensity of fluorescence of solutions and to determine the concentration of the fluorescent substances. To this end, a series of fluorescent solutions of known concentration are made up. The comparator then serves to indicate the concentration of an unknown relative to this series of standards.

The instrument makes it possible to carry out the comparing operation without effort or eye strain even for extremely faint fluorescence. The sensitivity of measurement is so high that minute quantities can be reliably determined. The instrument is simple in operation and does not comprise any delicate parts. It is suitable for use under any temperature and humidity conditions and can be operated from any power line regardless of voltage and frequency fluctuations.

The light of an incandescent or mercury vapor light source is collimated by a lens, is deflected by a mirror, and passes vertically through 3 flat-bottom vials. The fluoresence excited in the liquid is observed horizontally from the front. A split-field optical viewing system provides 3 fields of equal size, directly adjacent to each other and without any dividing lines between them. The 3 vials, brought together into this triple field, are viewed through an adjustable magnifying eye piece.

Laboratory Mixer

A new, simple-to-build, all-purpose laboratory mixer uses pint, quart, or two-quart standard mason jars. This mixer was developed by John A. Bennett and Fredric Haas in the Passaic, N. J., Laboratories of the Pantasote Company.

Standard mason jars serve as mixing containers and—by merely putting a top on them—for storage as well. This simple and fast interchangeability makes it necessary only to clean the agitator when changing batches. Dry materials as well as liquids may be added through a funnel attachment during mixing. In the photograph, a hot plate is shown in the background. The usual method of heating is by water bath on the hot plate. Loss of solvents is prevented when heating by the reflux condenser.

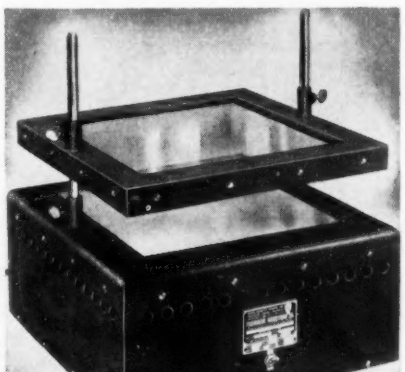
This simple and practical mixer requires very little material. It is constructed with angle irons, a top platform of wood, and a metal-covered wood base. A mason jar cover is inserted in the top of the platform and mixing jars are screwed into it. An electric mixer is so positioned that the shaft projects through a tubular bushing in the top. An adjustable chuck allows the agitator to be raised or lowered. A funnel, which is corked during operation, permits materials to be added during mixing. A reflux condenser returns volatilized solvents to the mixture. Another model uses a motor with a reduction gear for relatively viscous materials.

Mr. Bennett has made easy-to-follow specifications available to the trade, and will send blue prints to anyone who may request them.

Polarizer

A new polarizer has just been developed by Precision Scientific Co., 1750 N. Springfield Ave., Chicago 47, Illinois.

This apparatus is used to determine the amount of strain produced by fabrication



or mechanical manipulation of transparent, rigid and non-rigid plastic materials and can also be used to identify transparent plastics.

It consists of a source of illumination diffused through opal glass for uniformity. Above the light source are placed two polaroid sheets, sandwiched between clear glass, the upper glass section being adjustable through a distance of approximately 8″. It is finished in black and is 15″ square by 16″ high.

Rubber Stamps Save Time

A series of rubber stamps for reproducing the more commonly used ring systems is now available for the first time.

Prices are as follows: benzene, furan, cyclopentane, each $1.00; naphthalene, anthracene, each $1.25; cyclopentenophenanthrene, $1.50; complete set, $6.00. Chem-stamps, Box 421, Bayonne, N. J.

ADVERTISEMENT—*This entire page is a paid advertisement.* *Prepared Monthly by U. S. Industrial Chemicals, Inc.*

U.S.I. CHEMICAL NEWS

June ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1945

Airco Export Corp. to Represent U.S.I. in Foreign Markets

Mr. Glenn L. Haskell, President of U. S. Industrial Chemicals, Inc., has announced that the newly formed Airco Export Corporation has been appointed the selling agent for U.S.I. in all foreign countries except Canada.

In anticipation of a greatly expanding export market, the Airco Export Corporation is directing an intensified program on the sale of U.S.I. chemicals, resins, and other related products.

Airco Export Corporation has opened new offices and display rooms at 33 West 42nd Street, New York. Mr. H. R. Salisbury has been named President of the new corporation. The world-wide coverage of the Airco Export Corporation provides the logical medium through which U.S.I. will make its bid for increased foreign sales of chemicals and resins in the postwar era.

Process Using Ethanol Lengthens Shirt Life

To produce an air-and-water permeable fabric for collars and cuffs which will outwear the shirt, the inventor of a new process proposes a multi-ply fabric impregnated and bonded with ethyl cellulose.

The fabric plies, alternating with layers of cellulose acetate film, are first sewn together to form an assembly. A solution of ethyl cellulose and ethanol is prepared, diluted with water, and the cellulose-fabric assembly is padded through the solution until the fabric is saturated. It is washed, partially dried, and the damp assembly is then subjected to a pressure of 100 lbs. per square inch between plates at 175 deg. C.

The smooth, stiffened fabric thus obtained is integrally bonded together and is thoroughly permeable to air and moisture.

An alternate process uses a di-ortho-xenyl mono-phenyl phosphate plasticizer with ethanol, and ethyl cellulose.

Wear-resistance of these new stiffened fabrics appears to be substantially higher than untreated fabrics, although wear-resistance is decreased by repeated washings.

Chemical Properties Altered By X-Rays

Quartz and other crystalline materials undergo changes in elastic constants and chemical properties when subjected to ultra-short radiation such as x-rays and cathode rays, and to deutron bombardment from a cyclotron.

Of immediate interest is the use of this technique in setting and modifying oscillation frequencies of crystals used to control radio and radar equipment.

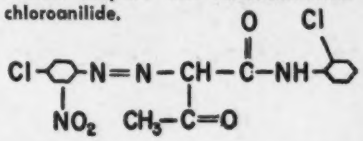
Since irradiation by the new x-ray technique greatly modifies the rate of solution and chemical reaction of crystals, it opens up a new field of photo-chemistry.

Bright Future Seen for Arylides in Making Improved Yellow Dyes

Use of Benzidine and Hansa Yellows Promises to Continue on Large Scale Despite Postwar Return of Chrome Yellows

Although the current shortage of metallic sodium has temporarily halted U.S.I.'s production of acetoacetarylides, the company looks forward to early and large-scale use of these intermediates in the synthesis of Hansa yellows and the newer benzidine yellows which have demonstrated both practical and economical advantages over the chrome yellows.

A typical "arylide" end product, Hansa yellow 3G. Diazotized p-chloro-o-nitro aniline coupled with acetoacet-ortho-chloroanilide.



Originally used as replacements for chrome yellows, these two yellows were found to possess several marked advantages over the unavailable chromes for which they were substituting. Printing inks made with the "arylide" dyes were more workable than those made with chrome yellows. Their greater tinctorial strength made brighter, clearer colors possible for pigmenting paper and protective coatings. This same high tinctorial strength also made the price differential between the new dyes and the chromes insignificant, for they go so much further than the chrome yellows.

Benzidine Yellows

Benzidine yellows are produced by combining tetrazo benzidine with acetoacetarylides. The yellow dyestuffs which result are non-bleeding in water, and in dilute acids and alkalies. In addition, they are fairly resistant to melted paraffin, alcohol and other common organic solvents except chloroform.

By varying the intermediates used, a great number of yellows can be produced having different characteristics of shade and fastness to various agents.

Hansa Yellows

Hansa yellows are made by coupling acetoacetarylides with diazotized aniline derivatives. The resulting dyes are particularly resistant to the action of sunlight and alkalies; qualities which make them desirable for formulating coatings to be used in exposed places. Like benzidine yellows, Hansas can

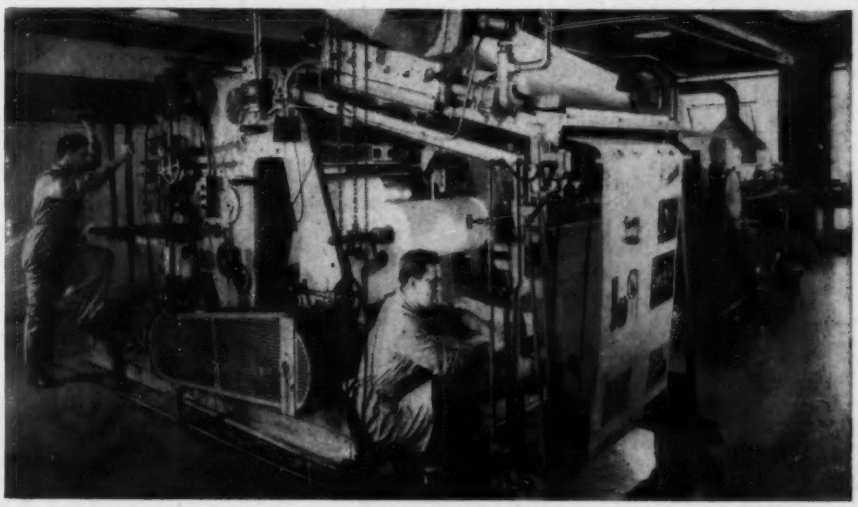
(*Continued on next page*)

Quick Test for Moisture Content of Dried Fish

In the usual method of testing dried fish for moisture, the fish are dried in a vacuum oven at 70 C. A new method, developed in Cape Town, S. A., is faster, and gives results to within 0.5 per cent of those secured by the usual method. The fish are extracted with boiling alcohol for 15 minutes, followed by determination of the critical solution temperature, with a paraffin-white oil mixture.

Analyzes Detergent Mixtures

Mixtures of soap and synthetic detergents may be analyzed by a new method which is said to give accurate results. The alcohol-soluble portion is extracted with ethanol, and the alcohol-insoluble salts are reprecipitated. Soap, fatty matter and alcohol-soluble chlorides are determined directly. Synthetic detergent is the difference between the total alcohol-soluble matter and the sum of soap, fatty matter and alcohol-soluble chlorides.



In the manufacture of colors for inks, Hansa yellows and the newer benzidine dyes have proven to be more practical, and just as economical as the prewar chrome yellows.

ADVERTISEMENT—*This entire page is a paid advertisement.*

June ★ **U.S.I. CHEMICAL NEWS** ★ 1945

Arylide Yellows

(Continued from preceding page)

be produced with widely varying characteristics by varying the intermediates.

Of the many factors that influence the quality and uniformity of Hansa and benzidine yellows, perhaps the most important is the purity of the acetoacetarylide intermediates. The exacting production methods employed by U.S.I. reduce impurities to a negligible minimum. Just as soon as there is an easing in the huge present demand for metallic sodium, U.S.I. will resume production of:

- acetoacetanilide
- acetoacet-ortho-chloroanilide
- acetoacet-para-chloroanilide
- acetoacet-ortho-toluidide
- acetoacet-ortho-anisidide

In addition, U.S.I. has developed the following new compounds:

- acetoacet-para-anisidide
- acetoacet-para-phenetidide
- acetoacetyl-alpha-naphthylamine
- NN'-diacetoacetbenzidide
- acetoacet-cresidide
- acetoacet-dianisidide
- diacetoacetyl-meta-toluylenediamine
- ortho-phenylacetoacetanilide
- acetoacet-para-nitroanilide

Samples of a majority of these intermediates are available for laboratory experimentation.

Ethanol, Acetone and Ether Aid Hormone Preparation

Prolactin, a lactogenic hormone extracted from the anterior lobe of the pituitary, is being used in treatment of cases of delayed or insufficient lactation.

This new biological is prepared by stirring an acetone-dried powder extract of animal anterior pituitaries with ethanol to which concentrated hydrochloric acid has been added. After centrifuging, the supernatant liquid is decanted and precipitated with 1-molar sodium hydroxide to provide a pH value between 7 and 9.

The last step is to settle the precipitate under refrigeration, separate it by filtering or centrifuging, and drying it with ether. Its assay is 10-12 Riddle units per milligram.

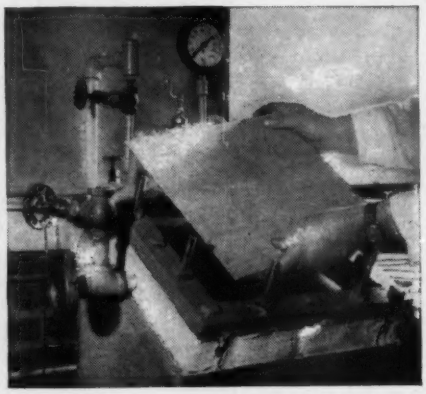
Ethanol Used 5 Times To Produce Galacturonic Acid

A purer α-d-galacturonic acid, for use in pharmaceuticals, is claimed for his newly patented process by a Pennsylvania inventor. Starting with a pectin and heated water mixture to which an enzyme system has been added, the solution is allowed to cool to 40 C. Following addition of toluene, the solution is kept at room temperature until the iodine number becomes constant, when it is concentrated under reduced pressure.

After warming to 60 C., ethanol is mixed with the concentrated solution, the insoluble material is permitted to settle, and the remaining sludge is washed by decanting twice with ethanol. Then the decanted wash liquor is chilled, and more insoluble gummy material is permitted to settle.

Following further purification with activated charcoal, the filtrate is concentrated, seeded and chilled. The mass of crystals which forms is broken up, triturated with ethanol, filtered, washed with ethanol and then dried. The resulting product is said to be a very pure α-d-galacturonic acid.

AMERICA'S ONLY "TIN MINES" are in American kitchens. Turn in your empty tin cans regularly.



To study plywood adhesives, U.S.I.'s resin laboratories have designed and built this miniature glue press which duplicates conditions encountered in large presses. The specimen to be laminated is placed between a rubber sheet and a steel plate. Air pressure expands the rubber sheet, firmly and uniformly forcing the plywood against the steel plate. Steam generated within the chamber supplies the heat.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

A coating for magnesium promises to extend the use of this light metal in industry. One coat is said to provide a decorative finish for interior use, while two or more coats give years of outdoor protection. There is also a clear finish for polished magnesium surfaces. **(No. 942)**

USI

A new enamel, intended for painting surfaces exposed to very low temperatures is claimed to be acid-fume resistant, odorless and non-yellowing. Supplied in white, it may be tinted with oil colors. A companion primer is offered for application on asphalt and mastic finishes. **(No. 943)**

USI

A soybean drying oil is claimed to be practically the equal of linseed oil for use in paints, varnishes and synthetic resin products. It comes in two viscosities, F-G and D-E. **(No. 944)**

USI

Maintaining oil viscosity at a given point, and independent of temperature change, is the announced function of a new additive for lubricating and hydraulic oils. **(No. 945)**

USI

A light-colored plasticizer, developed specifically for use in light-colored GR-S stocks and black stocks which will not stain light finishes, is announced. The new compound is said not to affect the rate of cure appreciably. **(No. 946)**

USI

Alternates for citrus oils, to flavor candy and other food products, are announced. Standard flavors are orange, lemon and lime. **(No. 947)**

USI

A new line of metallic phosphates is announced as ready for post-war production. One is said to impart ultra-violet radiation properties to glass, and to give it superior optical, electrical and mechanical qualities. The second, a white pigment, and a third, a source of enriching iron for foodstuffs, are mentioned. **(No. 948)**

USI

New aliphatic derivatives, made up of the even-numbered normal hydrocarbons from C_8 to C_{18}, and their corresponding olefins, alcohols, ethers, mercaptans, etc., are suggested for use in cosmetics, plasticizers, corrosion inhibitors, oil additives, insecticides and stabilizers. **(No. 949)**

USI

A new hand cream to remove paint, as well as lacquer, enamel and resins, is designed to be worked into the skin like soap, then rinsed off with water. **(No. 950)**

USI

A colloidal aluminum-silicate gel, with a particle size ranging from 0.1 micron to 1 micron, is offered with the statement that it may be moderately acidified or alkalized without physical or chemical reactions. It is recommended for use in rubber, adhesives, paints and similar products. **(No. 951)**

USI

To protect frozen foods, a new thermosetting coating, applied by dipping, is described as forming a homogenous protective film over the entire product. **(No. 952)**

U.S.I INDUSTRIAL CHEMICALS, INC.

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Butyl Alcohol
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Completely Denatured—all regular and anhydrous formulas
Pure—190 proof, C.P. 96%, Absolute
*Super Pyro Anti-freeze
*Solox Proprietary Solvent
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Ansol M
Ansol PR

ACETIC ESTERS
Amyl Acetate*
Butyl Acetate
Ethyl Acetate
OXALIC ESTERS
Dibutyl Oxalate
Diethyl Oxalate
PHTHALIC ESTERS
Diamyl Phthalate
Dibutyl Phthalate
Diethyl Phthalate
OTHER ESTERS
*Diatol
Diethyl Carbonate
Ethyl Chloroformate
Ethyl Formate

INTERMEDIATES
Acetoacetanilide
Acetoacet-ortho-anisidide
Acetoacet-ortho-chloranilide
Acetoacet-ortho-toluidide
Acetoacet-para-chloranilide
Ethyl Acetoacetate
Ethyl Benzoylacetate
Ethyl Sodium Oxalacetate
ETHERS
Ethyl Ether
Ethyl Ether Absolute—A.C.S.
FEED CONCENTRATES
*Curbay B-G
*Curbay Special Liquid
*Vacatone 40

ACETONE
Chemically Pure
RESINS
S&W Ester Gums—all types
S&W Congo Gums—raw, fused & esterified
S&W *Aroplaz—alkyds and allied materials
S&W *Arotene—pure phenolics
S&W *Arochem—modified types
S&W Natural Resins—all standard grades
OTHER PRODUCTS
Collodions
Ethylene
Ethylene Glycol
*Indolone
Nitrocellulose Solutions
Urethan

*Registered Trade Mark

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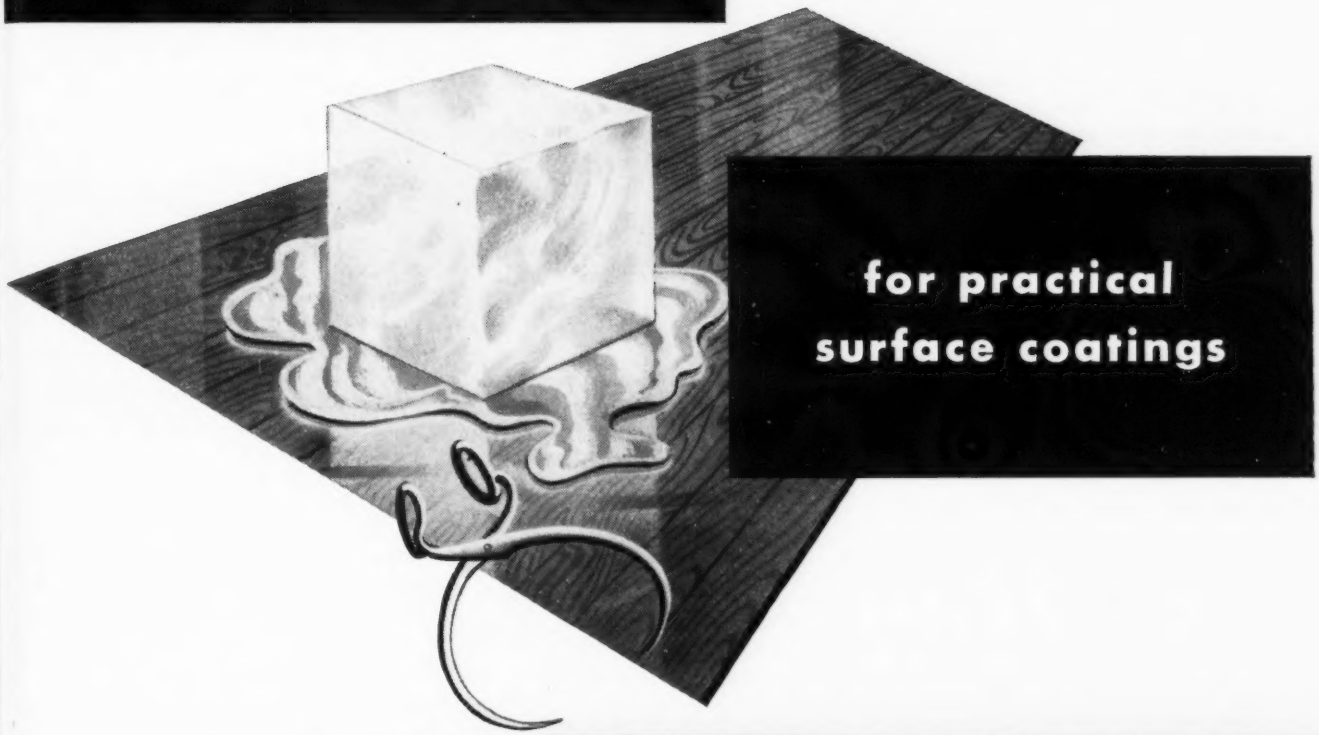

for practical surface coatings

→ No. 1100
→ No. 1102
→ No. 1123

BECKACITES

WIDELY USEFUL MODIFIED PHENOLICS

In these days of shortages and war-altered products it's good to know that for your basic varnishes and vehicles you can still procure basically sound resins. The three Beckacites listed here, for example, can be relied upon to produce surface coatings worthy to bear your name. No. 1100 Beckacite is a fine all-purpose resin, giving normal cooking procedures, good viscosity, quick drying and good abrasion resistance. No. 1102 Beckacite combines excellent results with genuine economy. No. 1123 Beckacite is for top quality varnishes and enamels—assuring fast bodying in the kettle . . . fast drying, particularly with soft oils . . . and exceptional wearing properties. Put your formulation on a firm basis—write to the Sales Department at RCI for further facts about these widely useful modified phenolic resins.

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INDUSTRY'S BOOKSHELF

Amino Acids and Proteins

THE AMINO ACID COMPOSITION OF PROTEINS AND FOODS. ANALYTICAL METHODS AND RESULTS. *Richard J. Block and Diana Bolling.* Charles C. Thomas, Publisher, Springfield, Illinois, 1945; 396 pp., $6.50. Reviewed by E. A. Swart, University of Pennsylvania Medical School.

IN THIS EXTENSIVE monograph, the authors have done an excellent job of collecting and correlating a great many analytical procedures for the determination of several essential and non-essential amino acids. The subject matter is broadly divided into eight main headings, paralleling the general analytical procedures followed in the laboratory: chapter I deals with the basic amino acids, chapter II with the aromatic amino acids, chapter III with sulfur-containing amino acids, and so forth.

Since the determination of the amino acids content of a protein requires preliminary hydrolysis of the protein, the isolation of the amino acids of the group is first discussed under each main heading. "The susceptibility of each and every amino acid to loss during hydrolysis is different and differs not only with the conditions of hydrolysis but more so with the presence or absence of other substances in the hydrolysis mixture." This statement from the authors' introduction epitomizes their attack of this problem. Their critical analysis of isolation procedures, with a description of attempts to evaluate hydrolytic losses, is a great aid to workers in this field. In pointing out the advantages and disadvantages of the various methods under different laboratory conditions, they attempt to help the laboratory worker to choose that method best adapted to his particular problem.

Following the discussion of the isolation of the amino acids of the group is a description of the methods used for determining each acid of the group. Here again, a critical analysis of each procedure is given.

The final subdivision of each chapter is concerned with the presence of the group amino acids in proteins and foods. Data is presented in tabular form of the percentage composition of these amino acids in many proteins and foods, as reported in the literature and as determined in the authors' laboratory. For the dietitian, this compilation of data is extremely important, pointing the way to the prognosis of various amino acid dietary deficiencies. For the medical man, this assumes increasing importance in the light of the observation that certain amino acids are needed in pre- and post-operative treatment, as well as in the treatment of other physiological disorders.

In chapter IX, general methods of isolation and separation of amino acids are discussed. And finally, in summary, tables are presented giving the amino acid compositions of many proteins, as collected from the tables at the end of each of the other chapters. An extensive bibliography of 699 papers, an author index, and a subject index complete the material presented.

This monograph is recommended to chemists, doctors, and dietitians as an authoritative collection of tested analytical methods for the determination of amino acids, and of results obtained by these methods on proteins and foods.

Monograph on Acetylene

THE CHEMISTRY OF ACETYLENE, *J. A. Nieuwland* and *R. R. Vogt.* Reinhold Publishing Corp., New Yqrk, 1945; 219 pp., $4.00.

IN THIS WORK an attempt is made to present a brief but fairly complete account of the preparation, properties, and reactions of acetylene along with an extensive classified bibliography. An American Chemical Society Monograph, it follows a characteristic method of presentation: There is a chapter each on the properties, preparation and purification of acetylene; its metallo-derivatives; nonmetallic substitution products; addition compounds; and polymerization and condensation.

Since there are few books on this subject in English, this work fills a definite need.

The literature, unfortunately, is not covered, for most topics, beyond 1938. Also, there are very few unpublished data; but this is to be expected and probably does not lie within the scope of this text.

Text on Explosions

EXPLOSIONS, THEIR ANATOMY AND DESTRUCTIVENESS, *Clark Shove Robinson.* McGraw-Hill Book Company, Inc. New York, 1944; 88 pp., $1.50.

THIS STUDY AIMS to describe as simply as possible, the sequence of events that lead up to an explosion, the phenomena produced, and the effects of these phenomena on the surroundings. It is based on lectures given in Chicago in the fall of 1943 before auditors of the Safety and Security Branch of the Office of the Chief of Ordnance, Army Service Forces.

The book first defines what an explosion is and then discusses means and methods of initiation, following the progress of the detonation through its various stages to the final results of this detonation. Succeeding chapters cover missiles, earth-waves, craters from explosions, and effects of explosion blast, missiles, and seismic effects on structures.

An interesting feature is the chapter "A Study of Some Notable Explosions." This information is augmented by an extensive chart in the appendix giving location, year, weight of explosive, type, kind of confinement, crater size, number of people killed and hurt, limit of serious damage, minor damage, missile distance and limit of glass breakage. In addition to the appendix, the final chapter furnishes conclusions and a bibliography.

Vegetable Drugs

THE CHEMISTRY AND PHARMACY OF VEGETABLE DRUGS, *Noel L. Allport,* Chemical Publishing Co., Inc., Brooklyn, N. Y., 1944, 252 pp., $4.75.

DIRECTED PARTICULARLY to those interested in pharmacy, this volume deals with the derivation and properties of all the principal vegetable drugs. The author has compiled the material by grouping the drugs according to the chemical nature of their active principles. From this method the reader is able to ascertain the relative value of drugs of secondary importance as compared with the more important ones. Many photographs, diagrams and tables have been included. Six chapters deal with different divisions of the alkaloidal drugs.

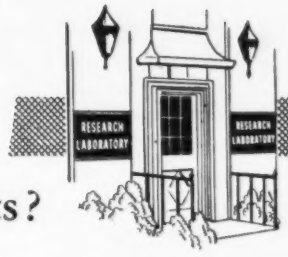
Other Publications

1942 MINERALS YEARBOOK, heretofore confidential, has been released for public distribution. Compiled and published annually, the Yearbook records information on the production, distribution and consumption of minerals during one of the most critical war years in which the metals, fuels and other nonmetallic minerals industries reached unparalleled production heights. Both domestic and foreign data are included. Nearly all chapters are available separately. The book may be obtained from the Superintendent of Documents, U. S. Printing Office, Washington 25, D. C. Price $2.25.

SECTION IV OF THE HANDBOOK OF STANDARDS FOR DESCRIBING SURPLUS PROPERTY is now available from the Superintendent of Documents of the Surplus Property Board. This section covers the following classes of property: chemicals, drugs, medicines, oils, fats, waxes, cosmetics, and household chemical preparations. Section III covering textile, leather, and fiber, crude, basic and finished products, and section V, on glass, clay, stone and other nonmetallic mineral, crude, basic, and finished products have also been published. These standards are designed to furnish sufficient information in commercial terms to allow a surplus property disposal agency to arrange for resale without calling upon the owning agencies for additional items of description. Price 15 cents.

A. S. T. M. SPECIFICATIONS FOR STEEL PIPING MATERIALS AND A. S. T. M. STANDARDS ON PAPER AND PAPER PRODUCTS have recently been compiled and published. The 337-page, paper covered book on steel piping groups the material as follows: pipe, boiler tubes, still tubes for refinery service, heat-exchanger and condenser tubes, castings, forgings and welding fittings and bolting. Price $2.00. The 192-page second edition of paper and paper products standards provides all 49 specifications, test methods, and related standards that have been developed through the work of A. S. T. M. technical committees. Price $1.50. Both books are available from A. S. T. M. Headquarters, 260 S. Broad St., Philadelphia 2, Pa.

Have You Investigated the Possibilities of These Two New Columbia Products?



BUTADIENE MONOXIDE AND DIGLYCOL CHLOROFORMATE

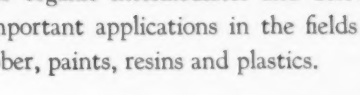
Introduced earlier this year, Butadiene Monoxide and Diglycol Chloroformate are already the subjects of experiments in many industrial laboratories.

In the event you have not investigated the possibilities of these new materials, a brief description is repeated:

BUTADIENE MONOXIDE

Butadiene Monoxide (3,4-Epoxy-1-butene) (Vinylethylene Oxide) is a colorless, relatively volatile, liquid organic compound possessing both carbon to carbon unsaturation and an alpha-epoxide group. The reactions characteristic of these two organic groups render this compound useful in diverse organic processes, such as the production of polymerizable alkyd resins, unsaturated alcohol ethers and esters. They suggest interesting possibilities in a variety of other organic chemical products and pharmaceuticals.

DIGLYCOL CHLOROFORMATE



Diglycol Chloroformate [Diethylene Glycol Bis(chloroformate)] is a new chemical intermediate to fill the need for a non-volatile, relatively easily handled organic dibasic acid chloride. It is reactive, for example, with alcohols or amines to form other organic intermediates and derivatives . . . suggesting important applications in the fields of pharmaceuticals, rubber, paints, resins and plastics.

TECHNICAL DATA AND SAMPLES AVAILABLE

If you are interested in investigating the usefulness of either or both of these materials for your own products, write to our General Sales Offices for Technical Bulletins. Then, if the properties and characteristics described indicate potentialities for your business, samples may be obtained for laboratory experimentation.

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BOOKLETS & CATALOGS

Chemicals

A785. Acid-Proof Cements produced by the Quigley Company are described in an 8-page booklet, listing available types and suggested uses.

A786. Adenine. The composition, properties and uses of adenine and its salts are described in a leaflet issued by the Schwarz Laboratories.

A787. Adhesives. A new booklet on natural and synthetic rubber adhesives has been published by the B. F. Goodrich Company. Directions for the application of natural and synthetic rubber cements are included.

A788. Concrete Hardeners. A description of Masterplate concrete floors and method of installation is included in a 24-page booklet of the Master Builders Company.

A789. Dresinates. The use of Dresinates in alkaline cleaning compounds is covered in a booklet issued by the Paper Makers Chemical Department of the Hercules Powder Company.

A790. Ferro Colors. Color chips of forty oxide colors for the preparation of porcelain enamels are contained in a folder of the Ferro Enamel Corporation.

A791. Filter Paper. Analytical filter papers for use in the chemical laboratory are described and priced in a 24-page booklet of Carl Schleicher & Schuell Company.

A792. Lacquers. An 8-page non-technical leaflet, listing reasons for the development of the new high solids lacquers, a short chronology, and a discussion of their advantages has been issued by the Hercules Powder Company.

A793. Paint. "What Type of Postwar Exterior House Paint Will Be Made?" titles a 15-page booklet of the New Jersey Zinc Company.

A794. Plastics. An 8-page pamphlet has been issued by the du Pont Plastics Department to provide a digest of the plastic products which they produce.

A795. Protective Coatings are described, and typical applications for metal, cement, wood and brick surfaces are given, in a 20-page booklet of the Reilly Tar and Chemical Corporation.

A796. Quadrafos, sodium tetraphosphate beads are described in a 4-page leaflet of the Rumford Chemical Works.

A797. l-Sorbose. The composition, properties, derivatives, and uses of l-sorbose are the subject of a 4-page folder of Schwarz Laboratories, Inc.

A798. Synthetic Rubber Sheet Stocks are described in a 10-page technical service manual published by the Fabrics and Finishes Department of the du Pont Company.

Equipment—Methods

F357. Bearings. Morganite self-lubricating bearings are described in a folder issued by the Morganite Brush Company.

F358. Chain. Corrosion resistant chain is the subject of a 4-page folder of the Youngstown Welding and Engineering Company.

F359. Construction. A complete picture story of the fabrication and erection of gas holders, storage tanks, processing vessels, and other structures is contained in a 44-page bulletin of the Stacey Brothers Gas Construction Company.

F360. Equipment. Many types of equipment used by the chemical industry are described in the 96-page general catalog of the First Machinery Company.

F361. Feed Systems. Milton Roy Feed systems for the internal or sodium sulfite treatment of boiler water are described in a 4-page leaflet.

F362. Forgings. The Titusville Forge Division of the Struthers Wells Corporation has issued an 8-page bulletin describing the company's facilities for precision forgings of all sizes and metals.

F363. Fork Lift Trucks. The Towmotor Corporation has collected the various catalogs, which they have issued, describing their fork lift trucks, into a single folder, the Towmotor Data File.

F364. Gas Analysis. A 96-page catalog describing Burrell gas analysis apparatus, containing a 44-page manual for gas analysts has been issued by the Burrell Technical Supply Company.

F365. Spray Nozzles. Catalog No. 22 of the Spraying Systems Company shows capacities at pressures ranging from 1000 to 7000 pounds on 85 separate combinations of orifice and core sizes. The complete line of Spraying Systems nozzles and accessories is described.

F366. Steam Power Plant. A 40-page steam power plant planning guide has been announced by the Westinghouse Electric and Manufacturing Co. Part I illustrates the types and sizes of turbines; Part II covering performance data.

F367. Steam Tank Heater. A new immersion type steam tank heater is described in a recent leaflet of the Brown Fintube Co. Dimensions and weights of the heaters are given.

F368. Thermometer. A 12-page bulletin of the Bailey Meter Co. lists the outstanding features and gives the information required for best utilization of their Pyrotron electronic resistance thermometers.

F369. Thickness Gage. An 8-page booklet of the General Electric Company, GEA-4363, describes three types of thickness gages, for measuring the thickness of non-magnetic coatings. One is for measuring the thickness of metal coatings, another for measuring the thickness of paint films and heavy coatings, the other for measuring the thickness of sheets of material such as glass, mica, etc.

F370. Tube Cleaning. A step-by-step check list of the correct steps to be taken in tube cleaning, and a listing of the types and sizes of the required equipment are included in a 6-page folder of Thomas C. Wilson, Inc.

CHEMICAL INDUSTRIES TECHNICAL DATA SERVICE

Chemical Industries, 522 Fifth Ave., New York 18, N. Y. (6-5)

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A785	A790	A795	F357	F361	F366
A786	A791	A796	F358	F362	F367
A787	A792	A797	F359	F363	F368
A788	A793	A798	F360	F364	F369
A789	A794			F365	F370

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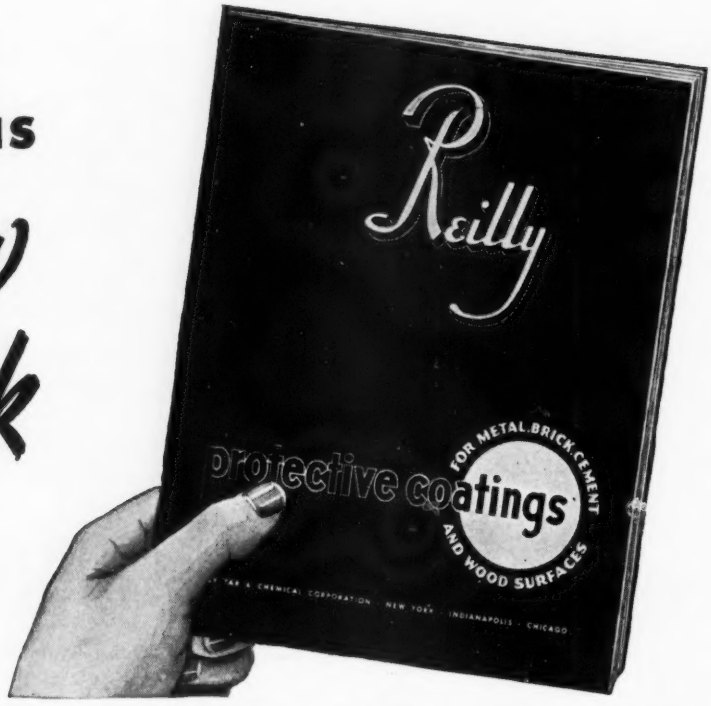

on Protective Coatings

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REILLY COLD APPLICATION PAINTS, for the protection of storage tanks, structural steel, stacks, towers and other metal construction designed for service above ground, under ground or under water; REILLY RESISCOTE (available in colors) for use on internal combustion engines, steel pickling houses and other metal and concrete surfaces; REILLY CREOCOTE (available in colors) for use on creosoted wood block floors, poles, posts and other creosoted surfaces.

Also—REILLY PIPE ENAMEL & PRIMER, for hot application to pipe lines for the transportation of oil, gas, gasoline and water; and REILLY BITUMINOUS PIPE DIP COMPOUND, for hot-dipping cast iron pipe and fittings.

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NEWS OF THE MONTH

Tax Policy Threatens Research Institutes

The Battelle Memorial Institute, which has considered itself tax exempt since it was formed in 1929, has been asked by the state of Ohio to show cause why it should not pay a personal property tax. The important questions are whether the Institute is "exclusively for charitable purposes" and whether any of its property is used for business as defined by state law.

Briefs have been submitted, and it is expected that State Tax Commissioner C. Emory Glander will reach a decision within the next two or three weeks. Battelle officials were contacted at press time but felt that it was too soon to make comment.

If the decision is unfavorable it may be appealed to a three-man board of appeals and finally to the Ohio Supreme Court. The decision is awaited with interest in that it has far-reaching implications for other institutions organized in a similar manner.

U. S. to Get Philippine Copra

Foreign Economic Administrator Leo T. Crowley has announced the signing of a contract between the U. S. Commercial Company and the Copra Export Management Company for the procurement of copra, copra products, and copra by-products in the Philippine Islands.

The Copra Export Management Company is a corporation formed by the representatives of five companies which were engaged in the copra export trade in the Philippine Islands, prior to the war. Under the terms of the agreement Copra Export Management Company will assume responsibility for procurement on USCC account, in the Islands, and will serve as the agent of the USCC in all transactions involving copra. Additional concerns may participate in the program by signing this agreement. When the agreement ceases to be operative, the Compra Export Management Company will be dissolved.

The company was formed to provide an agency experienced in Philippine copra procurement to operate only during the period when normal trade with the Philippines cannot be conducted. The USCC and trade representatives have effected this arrangement to speed procurement of coconut oil and copra which are in extremely short supply throughout the world.

The Copra Export Management Company will begin purchasing as military conditions permit. In order to expedite operations a resident manager of the Company, now in the Philippines, has been appointed. A copra buying mission will leave soon for the Islands. The five companies now participating in the agreement are the Philippine Refining Company, Spencer Kellogg & Sons, Inc., The Proctor & Gamble Trading Company, The El Dorado Oil Works, and Atkins Kroll & Company.

Fauser to Manage W. R. Warner Co.

Edwin F. Fauser, president and general manager of Standard Laboratories, Inc., has been appointed executive vice-president and general manager of William R. Warner & Co., Inc.

Washington Examines Patent Set-Up

President Truman has requested Secretary of Commerce Henry A. Wallace to make an objective study of the operation and effectiveness of the patent laws to determine wherein they are being misused to support unlawful monopolies.

The study will be made by William H. Davis, Director of Economic Stabilization; Dr. James F. Kettering, chairman of the National Patent Planning Commission; and Dr. Vannevar Bush, director of the Office of Scientific Research and Development. Mr. Davis will act as chairman. The group hopes to submit its recommendations to Mr. Wallace by June 30, 1945.

Sterling Buys Winthrop "B" Stock

Sterling Drug, Inc., has purchased at public auction the Class B Common Stock of Winthrop Chemical Co. for $9,500,000. Consisting of 6,150 shares and representing 50 per cent interest in Winthrop, the class B stock was sold by General Aniline & Film Corp. upon authorization of the Alien Property Custodian. The purchase brings Sterling into full ownership of Winthrop, since it has always owned the Class A Common Stock, which represents the other 50 per cent.

"Research within the Winthrop organization will be expanded and thoroughly integrated within the framework of the Sterling research program," it has been announced by James Hill, Jr., president of the Sterling Drug Company.

Western NY ACS Honors Dr. Schwarcman

The Western New York Section of the American Chemical Society has awarded the Jacob Schoellkopf Medal for 1945 to Dr. Alexander Schwarcman, of Spencer Kellogg & Sons, Inc., Buffalo. Presentation took place May 24. Dr Schwarcman was honored for his work in chemical processing of vegetable oils to replace raw material cut off by the war.

The medal, established in 1931, is given annually by the section for accomplishment constituting a major advance in science and embodying the spirit of research in industry. The presentation was made at a dinner at Niagara Falls, Ontario, by Frank E. Huggins, section chairman.

Williams Becomes Bell Chemical Consultant

Dr. R. R. Williams, lately chemical director of the Bell Telephone Laboratories, has been made chemical consultant to the laboratories in accordance with his expressed desire in order that he may be free to devote more of his time to matters of national interest in the field of nutrition.

Princeton to Have Plastics Program

Institution by Princeton University of a program of instruction and research in plastics which will be conducted jointly by five scientific departments has been announced by Professor Kenneth H. Condit, Dean of the Princeton School of Engineering.

The program is being developed with the assistance of an advisory committee of sixteen industrialists headed by George K. Scribner, president of the Boonton (N. J.) Molding Company.

The members are R. J. Moore, Tech. Coord., Bakelite Corporation; A. E. Pitcher, Gen. Mgr., Plastics Department, E. I. du Pont de Nemours & Co.; W. S. Landes, Vice-Pres., Plastics Department, Celanese Celluloid Corp.; E. B. Babcock, Vice-Pres., Firestone Tire & Rubber Co.; R. Hopkinson, Dir. Chem. Dev., United States Rubber Co.; N. A. Shepard, Chem. Dir., American Cyanamid Co.; W. J. B. Stokes, II, President, Joseph Stokes Rubber Co.; F. N. Williams, Vice-Pres,, Plastics Division, Monsanto Company; R. M. Burns, Chem. Dir., Bell Telephone Laboratories; R. V. Beshgetoor, Mgr., Plastics Dept., R.C.A. Victor Div., Radio Corporation of America; W. H. Milton, Jr., Mgr., Plastics Divisions, General Electric Co.; E. A. Stillman, President, Watson-Stillman Co.; A. W. Fritzsche, President, General Industries Co.; F. H. Shaw, President, Shaw Insulator Co.; and H. F. MacMillin, President, Hydraulic Press Mfg. Company.

The University committee consists of L. F. Rahm, associate professor of mechanical engineering; H. S. Taylor, professor of chemistry and dean of the Graduate School; K. H. Condit, professor of mechanical engineering; J. C. Elgin, professor of chemical engineering; H. D. Smyth, professor of physics; and C. H. Willis, professor of electrical engineering.

CALENDAR *of* EVENTS

Scheduled

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, Food and Nutrition Section. Gibson Island Conference. July 16-20.

AMERICAN ELECTROPLATERS SOCIETY. Convention. William Penn Hotel, Pittsburgh, Pa. June 18-21.

AMERICAN LEATHER CHEMISTS ASSOCIATION will hold the annual meeting at the Netherland Plaza Hotel, Cincinnati, Ohio, June 12-14.

WESTERN STATES COUNCIL, will study the light metals industry of the West, its war time development and postwar prospects at a two-day conference in Seattle June 21 and 22.

Canceled

AMERICAN SOCIETY FOR TESTING MATERIAL has canceled the five-day regular meeting, scheduled for Buffalo, June 18 to 22.

AMERICAN SOCIETY OF REFRIGERATING ENGINEERS has called off the 32nd spring meeting which was originally scheduled for Milwaukee June 11-13. This action will not affect the technical program. Spring meeting papers will be prepared and five will be published in a special June issue of *Refrigerating Engineering.*

Syracuse Honors Dr. White

Syracuse University recently conferred an honorary doctor of laws degree on Howard J. White, assistant manager of the rayon department of E. I. du Pont de Nemours & Co. Dr. White received a degree in pharmacy from Columbia University and one of bachelor of science from Syracuse. He has been connected with Du Pont since 1915.

Esso Labs Promotes Davis and Reeves

Garland H. B. Davis, left, former director of the research division of Standard Oil Development Company's Esso Laboratories, has been appointed to the marketing specialists group of Standard Oil Co., N. J. He will be in charge of sales research and engineering. E. Duer Reeves, right, will succeed Mr. Davis as research director. Dr. F. L. Miller will become associate director while Drs. Carl O. Tongberg and Stewart C. Fulton will join A. J. Blackwood in his capacity of assistant director.

Magnesium Production Increased

Three magnesium plants are being returned to full production schedule at the request of the War Production Board. They are the Defense Plant Corp. facilities at Velasco, Texas, operated by the Dow Magnesium Corp., which have been held in standby since last December; the DPC plant at Painesville, Ohio, operated by the Diamond Magnesium Corp., which has been limited, and the DPC plant at Luckey, Ohio, operated by the Magnesium Reduction Co. The latter two plants have been limited to 50 per cent of capacity since last December 31.

Louisville U. Founds Institute

The Board of Trustees of the University of Louisville has announced the establishment of the University of Louisville Institute of Industrial Research. This non-profit corporation, affiliated with the Speed Scientific School, will conduct contract research in engineering and science. Dr. Einar W. Jacobsen, president of the University is chairman of the board of managers. Dr. Robert C. Ernst, professor of chemical engineering, Speed Scientific School, and Ford L. Wilkinson, Jr., dean of Speed Scientific School, have been made director and executive vice-president, and president, respectively.

WMC Employs "Exit Interviews"

In an effort to reduce labor turnover in war plants, the War Manpower Commission has instructed its 12 regional directors to request plant managements to see that workers who have given notice of quitting are personally interviewed.

Pointing out that turnover is high in some areas, WMC said that "exit interviews," conducted by experienced interviewers, have proved beneficial in encouraging workers to stay on the job and in finding out the reasons why workers leave so that remedial action can be taken.

The WMC surveys indicate that the best results from exit interviews are obtained when:

1. There is minimum delay between the worker's notice of intent to quit, or notice from supervisors of intended discharge, and the interview.
2. The interview is made by appointment.
3. The worker is assured of privacy during the interview.
4. Experienced interviewers are used.

WMC said that apparently results are more successful when men are used to interview men and women interviewers are used to interview women workers. Experience also shows that the interview should never be conducted by the worker's supervisor.

Secretary Perkins indicated also that in 1944 the loss of actual working time was more than 43.5 million work days,

which is equivalent to full annual employment for 145,000 workers. Only two of the major industry groups had increased accidents during 1944: trade and railroads. In neither case, however, was the increase very marked.

Secretary Perkins attributed the gains to safety instruction and accident prevention campaigns, in which safety experts of the U. S. Department of Labor brought a working knowledge of industrial safety techniques to nearly 30,000 plants engaged in the production of war materials. In addition, the department's safety training programs resulted in the basic training of 65,000 keymen, production supervisors and approximately one half million foremen. It is more than likely that the tremendous increase in general safety consciousness resulted from this work, which was supplemented by the activities of other safety groups in government and industry.

Hochwalt to Direct Monsanto Labs

Dr. Carroll A. Hochwalt, formerly associate director of the central research laboratories of the Monsanto Chemical Co., is succeeding Dr. Charles Allen Thomas in the position of director of the laboratories.

New York Section A. C. S. Chooses Baker

Dr. Ross A. Baker, professor of chemistry in the School of Business and Civic Administration of the College of the City of New York, was elected chairman of the New York Section of the American Chemical Society at the Section's annual meeting held May 11.

Dr. Baker succeeds Dr. Beverly L. Clarke, head of the analytical department of Bell Telephone Laboratories, Inc. Dr. Cornelia T. Snell was chosen chairman-elect, Dr. Henry B. Lowe, treasurer, and Dr. E. J. Durham, secretary. Directors were named as follows: R. A. Baker, B. L. Clarke, E. J. Durham, C. G. King, R. E. Kirk, H. B. Lowe, and C. T. Snell.

Thirty-eight members of the Section were elected to the National Council of the American Chemical Society. Dr. Ralph H. Muller was elected chairman of the jury which will select the winner of the William H. Nichols Medal for 1946. Other members of the jury are Charles N. Frey, Vincent du Vigneaud, B. L. Clarke, R. A. Baker, and E. J. Durham, secretary.

Merck Expands Board

James J. Kerrigan and Henry W. Johnstone, both vice-presidents of Merck & Co., Inc., manufacturing chemists, have been elected to the board of directors. These elections represent additions to the board, which formerly numbered nine members. All previous board members were re-elected.

Mr. Kerrigan is in general charge of the company's commercial activities. Mr. Johnstone is in charge of personnel and plant operations.

Industry Plans Postwar Changes

The automotive and transportation equipment lines, chemicals, electrical machinery, machinery, rubber and transportation equipment industries, indicate the highest percentage of planned change according to an analysis of recently tabulated responses of wholesalers and manufacturers to a nationwide questionnaire on postwar plans by Dun & Bradstreet. The tobacco industry shows the smallest percentage of proposed change in product or method, but leads all others in plans to expand sales territories.

A simple questionnaire was sent, late in the Fall of 1944, to 170,000 companies, mostly manufacturers and wholesalers. The principal questions addressed to the companies were: Are you planning to (1) manufacture or distribute new products or lines? (2) Sell new classes of customers? (3) Expand or contract sales territories.

AAUW Honors Dr. Blodgett

Katherine B. Blodgett, of the General Electric Research Laboratory, has been chosen as recipient of the $2,500 Achievement Award of the American Association of University Women, which is given annually to an outstanding woman scholar. Dr. Blodgett's researches have been in the field of molecular films.

Chicago A. C. S. Elects Officers

M. H. Arveson, senior technologist with the Standard Oil Company (Indiana), has been elected to the chairmanship of the Chicago Section, American Chemical Society. Dr. D. L. Tabern, research chemist, Abbott Laboratories, was elected first vice-chairman; Dr. C. L. Thomas, supervisory research chemist, Universal Oil Products Company, second vice-chairman; Dr. G. M. Schmeing, professor of chemistry, Loyola University, secretary, and Dr. Walter M. Urbain, head, division of physics and physical chemistry, Research Laboratories, Swift & Co., treasurer.

Postwar Changes Planned by Manufacturer—By Industry Groups

*Industry Group**	*Concerns Reporting***	*Plan to Manufacture New Products?* Yes %	No Change %	*Plan to Sell New Classes of Customers?* Yes %	No Change %	*Plan to Expand or Contract Sales Territories?* Ex-pand %	Con-ttract %	No Change %
Apparel	1,715	21	79	19	81	43	***	57
Automobiles	129	46	54	42	58	55	***	45
Chemicals	904	56	44	39	61	61	2	37
Electrical machinery	451	52	48	37	63	51	1	48
Food	1,400	31	69	23	77	48	***	52
Furniture	882	32	68	21	79	41	1	58
Iron and steel	1,449	38	62	34	66	44	1	55
Leather	452	35	65	25	75	46	***	54
Lumber and timber	594	24	76	22	78	25	***	75
Machinery (except electrical)	1,508	48	52	39	61	55	***	45
Nonferrous metals	640	38	62	31	69	41	***	59
Paper	448	42	58	36	64	44	2	54
Petroleum and coal	72	33	67	35	65	49	***	51
Printing and Publishing	606	23	77	29	71	38	1	61
Rubber	100	52	48	38	62	46	3	51
Stone, clay and glass	499	33	67	24	76	38	1	61
Textiles	770	33	67	26	74	38	***	62
Tobacco	44	11	89	9	91	64	***	36
Transportation equipment#	98	52	48	54	46	59	2	39
Manufacturers not elsewhere classified	885	48	52	32	68	48	1	51
All manufacturers	13,666	37	63	29	71	46	***	54

* Each industry group includes not only the products named, but also kindred and allied products, and, in the metal groups, products made from the metals named.

** The number varies slightly from question to question since not all reporting concerns answered every question. The figure included for each line and for "all manufacturers" is the median; thus the total of the individual lines is 13,646 not the same as that listed for "all manufacturers."

*** Less than one per cent.

Includes aircraft and parts, shipbuilding and repairing, railroad equipment, motorcycles, bicycles and parts, etc.

Phthalic Expansion

After the newly approved plants and plant expansions realize maximum production capacity, the anticipated annual output of phthalic anhydride is expected to be approximately 190,000,000 pounds, War Production Board officials told the members of the Phthalic Anhydride Industry Advisory Committee at a recent meeting.

Three plants nearest to completion are as follows:

Standard of California plant in Richmond, Calif.—expected to start production in June; Koppers Chemical plant in Pittsburgh—expected to start in July; and Pittsburgh Coke and Chemical Co.—expected to start in August. It is anticipated that each plant will have a production capacity of between 7,000,000 to 8,000,000 pounds, WPB said.

The most recently approved plant, the Barrett Division of Allied Chemical and Dye Corp. at Ironton, Ohio, will have an estimated annual production of approximately 10,000,000 pounds, and is expected to be completed early in 1946.

Additional equipment to bring in an annual production of 4,500,000 pounds in each plant has been approved for the American Cyanimide plant at Bridgeville, Pa., and the Monsanto Chemical Co., at St. Louis.

This represents the total of the new plants and expansions approved to date, WPB said.

Although naphthalene production falls short of requirements, demands for the chemical for phthalic anhydride production are being met in full. In view of the shortage of naphthalene, future phthalic anhydride expansion should be based on the use of ortho-xylene, committee members agreed.

Alkyd Materials Tight

Although Army requirements for alkyd resins may show a slight decrease after V-E Day, Navy requirements for the resins for use in the Pacific area will be much heavier, representatives of the military told the Alkyd Resins Industry Advisory Committee at a recent meeting.

WPB officials pointed out that this may be an important factor in reconversion plans after V-E Day, inasmuch as it will limit the quantity of alkyd resins available for protective coatings for automobiles, refrigerators, washing machines and similar consumers' durable goods requiring such finishes.

Phthalic anhydride, used in the production of alkyd resins, is one of the most critical raw materials in the war production program, the committee was told. While an increase in phthalic anhydride production is expected in the coming months, the additional output will be reserved for the production of dibutyl phthalate for smokeless powder and dimethyl phthalate, used in the manufacture of insect repellents, WPB said. Monthly allocations of phthalic anhydride to the resin industry will probably continue at the current level for the remainder of the year.

There is at present no prospect for increased production of maleic anhydride, which is also in tight supply.

Freeport Sulfur Elects Neaman

Pearson E. Neaman, secretary since 1930 of Freeport Sulfur Co., which includes Cuban-American Manganese Corp. and Nicaro Nickel Co., has been elected a vice-president. He will continue in charge of legal affairs for Freeport and a member of the law firm of Battle, Levy, Fowler and Neaman.

Penicillin Output High

Approximately 3,200,000 vials of penicillin, each containing 100,000 units of the drug, have been released to normal trade channels for civilian distribution since March 15, 1945, War Production Board officials told members of the Penicillin Producers Industry Advisory Committee at a recent meeting.

It is anticipated that at least 250,000,000,000 units a month were to be made available for parenteral medication for civilians.

As reported to the committee, penicillin production for 1945 is as follows: January, 394,000,000,000 units; February, 405,000,000,000 units; March, 460,000,000,000 units.

In view of the increased available supply of penicillin, the committee recommended that consideration be given to the packaging of 200,000 unit vials of the sodium salt, and to the packaging of the calcium salt of the drug in 100,000 and 200,000 unit vials for civilian use. To date, only the sodium salt of penicillin was available for this purpose. Steps will be taken to make both sizes of both salts available.

A task committee was appointed to study the existing situation on essential civilian paint production. Upon completion, the report will be presented to the entire committee at a meeting in the near future.

Talc Demand Up

Consumption of talc during 1945 will total 340,000 tons, representing an approximate 20,000-ton increase over 1944, it was estimated at a recent meeting of the Talc Industry Advisory Committee, the War Production Board said recently.

Talc consumption in 1944, in turn, represented a 20,000-ton increase over 1943.

The continuing uptrend in talc demand reflected increased consumption over a broad list of end uses, including paint, roofing, paper, rubber and insecticides, rather than a major increase in any one end products, WPB said.

Production of talc dropped to about 320,000 tons in 1944, which was reflected in a drop in average inventories to about a six-week supply. This trend prompted the recent issuance of amended Order M-239, which channeled critical grades of talc into the most essential war needs, such as camouflage paint for the Navy and United States Maritime Commission. Industry advisory committee members expressed complete satisfaction with the order, in view of the low supply balance, but expressed the hope that, if they were able to recruit sufficient labor, they could bring production into line with consumption.

WPB reports showed that during 1944, 21 new talc mines shipped crude ore to mills, bringing the number of mines in operation to 87. However, 18 old mines closed down, which left a net gain of only three operating mines at the year end. Principal talc production is centered in the States of New York, Vermont, California and Georgia.

Chrome Production Increase Planned

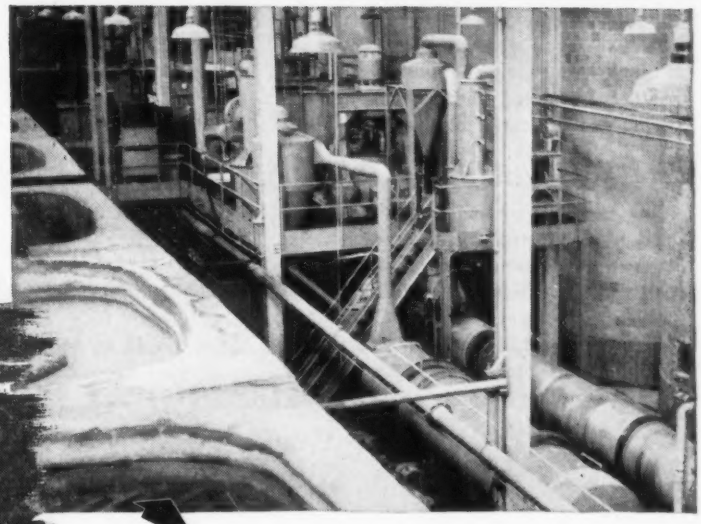
Current and future patterns of supply and requirements for primary chromium chemicals were discussed at a recent meeting of the Primary Chromium Chemical Producers Industry Advisory Committee.

While the entire output of chrome chemicals is relatively critical, sodium bichromate is in shortest supply, WPB told the committee.

WPB told the committee that a project for the production of approximately 10,000,000 pounds of sodium bichromate a quarter was under consideration. The

STOP CORROSION

with Prufcoat Protective Coatings



Prufcoat is in use on Concrete Structures, Steel Structures, Railway Tank Cars, Masonry Walls, Concrete Floors, Chemical Handling Equipment, Tank Trucks, Ventilating Systems, Cast Stone, Stucco, Brick, Sprinkler Systems, Cement Blocks, Chemical Tanks, *and has licked corrosion problems involving temperature ranges up to 230° F. and chemical agents such as* Acetic Acid, Alum, Bleach Solutions, Calcium Chloride, Chlorine, Cyanides, Formaldehyde, Flue Gases, Hydrofluoric Acid, Lactic Acid, Mineral Oils, Muriatic Acid, Nitric Acid, Oleic Acid, Oleum, Phosphoric Acid, Salt Solutions, Sodium Hydroxide, Steam, Sugar, Sulfonated Oils, Sulfuric Acid, Tri-Sodium Phosphate.

Cut Maintenance Costs

Low original cost and long life of Prufcoat make its application on all surfaces the lowest cost method of maintenance. For Prufcoat costs only slightly more per gallon than ordinary paint, costs no more to apply, *and yet provides positive protection against acids, alkalis, and water.* Thus, longer life and less frequent repaint jobs make maintenance savings certain.

Proved in hundreds of America's largest industrial plants during the past five years*, Prufcoat is being used today not only in areas where corrosion is severe, but on all structural steel and concrete, inside and outside. For Prufcoat cuts maintenance costs whether the corrosion problem is mild or severe.

Whatever your problem may be, chances are Prufcoat can show you a performance-proved treatment. Write today for descriptive folder.

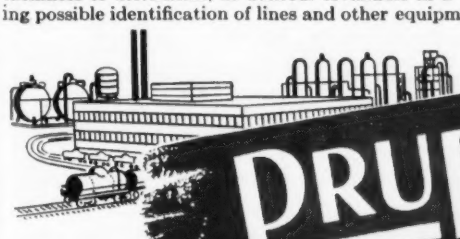
The Prufcoat film formed after Polymerization has virtually a zero acid number, saponification number and water absorption rate.

PERFORMANCE-PROVED ON CONCRETE AS WELL AS METAL SURFACES

Prufcoat Protective Coatings have been able to perform the heretofore thought impossible job of corrosion-proofing concrete, bricks, masonry, cast stone, etc., as well as metals and less troublesome surfaces. For the Prufcoat film is proof against the alkali reaction of concrete and similar materials, as well as acid-proof. Made from a special combination of synthetic resins and inert pigments, Prufcoat is applied by brush by your own maintenance crew, and dries by evaporation of the volatile solvents. Subsequent polymerization provides a tough, non-oxidizing, completely acid, alkali and waterproof film. The Prufcoat vehicle is crystal clear and contains no drying oils, wax, stearates or bitumen. Plasticity can be controlled from permanent tackiness to brittleness, as desired. Available in a variety of standard colors, making possible identification of lines and other equipment by color.

Prufcoat reports from some of America's largest plants (Names upon request)

* Prufcoat on all structural steel, pipes, pumps and tanks subjected to continuous dilute sulfuric acid fumes, drips and spills. No failure in two years.
* Entire concrete building coated with Prufcoat. No trace of failure due to blistering, peeling or chipping in over five years.
* Prufcoat on railroad tank cars carrying mixed acids and caustics—spills have not affected the coating in over two years.
* Prufcoat on exterior of muriatic acid storage tanks—no failure from spills of fumes since installation over two years ago.
* After several years of experience, Prufcoat has been made the standard corrosion-proofing coating for all maintenance work throughout the plant.



PRUFCOAT

gives Positive Protection against ACIDS, ALKALIS and WATER!

Prufcoat Laboratories Incorporated · 63 Main Street, Cambridge (42), Massachusetts

project calls for increased facilities at the idle Defense Plant Corporation magnesium plant at Lake Charles, La.

Since the meeting, the Louisiana project has been approved, and production is expected to start early in January 1946.

Alcohol Needs Still High

The need for continued maximum production of industrial alcohol was stressed by War Production Board officials at the recent meeting of the Industrial Alcohol Producers Industry Advisory Committee.

The current estimates of alcohol requirements as presented to the committee are as follows:

	Millions of Gallons of 190 Proof Alcohol			
	1942	*1943*	*1944*	*1945*
Direct Military and Lend Lease	71	103	84	94
Synthetic Rubber	...	126	330	343
Indirect Military and Civilian	128	148	160	165
Anti-Freeze	30	51	32	36
	229	428	606	638

Government stocks of alcohol were 81,000,000 gallons at the end of 1944, WPB said. Stocks at the end of 1945, according to present estimates, will drop to about 36,000,000 gallons.

The world sugar shortage continues to affect the supply of molasses available to the alcohol industry, WPB said. In view of this shortage, all East Coast alcohol producers have been required to shift to the use of grain, and, effective May 1, the rate of operation of alcohol producers using molasses in New Orleans plants has been reduced to approximately 70 per cent of capacity. WPB told the committee that efforts are being made to maintain production at New Orleans by equipping those plants to use grain to bring them back to maximum output.

Ceylon Graphite Supply Low

Members of the Carbon Brush Industry Advisory Committee at a recent meeting were warned by War Production Board officials that the supply of Ceylon graphite, necessary to the production of many carbon products, must be conserved. Increased demands of the military services, chiefly for dry cell batteries, were given as the reason.

The supply is now adequate, WPB officials told the committee, but it is expected that by midsummer requirements will be about double those for the same period last year. Extensive experiments are being conducted to find a substitute, but to date the results have not been satisfactory.

Soda Ash Adequate

Direct military requirements for soda ash for May were not as great as anticipated, and all essential military requirements were met, the Soda Ash Industry Advisory Committee reported at a recent meeting.

Lack of manpower, however, hampers the packaging of the chemical for important civilian requirements, and all packaged shipments are being delayed, they added.

The shortage of boxcars and hopper cars that confronted the industry a short time ago has cleared up, the committee said. Adequate transportation is now available at all plants, and prompt shipment of all but the package goods is expected.

Aromatics Improved

Supply and demand for aromatic petroleum solvents (both Class A, xylol range, and Class B, toluol range, as controlled by M-150) are now in balance, members of the Petroleum Derivatives Industry Advisory Committee informed the War Production Board at a recent meeting, WPB has announced.

The difficult problem of distribution of benzol solvents and benzol blended solvents under M-150 was presented to the committee for discussion and recommendation. The release of all such solvents from control of M-150, so that there could be wider distribution to all types of uses, was proposed by WPB as a solution to the problem. The committee, however, unanimously opposed such a move. Basis for this opposition was the extreme shortage of benzol needed for aviation gasoline. WPB said it would observe the committee's recommendation on this matter.

Bingham to Manage Virginia Smelting Sales

Chris F. Bingham, former district sales manager of the Columbia Chemical Division, Pittsburgh Plate Glass Company, has been appointed manager of industrial sales department, Virginia Smelting Company, West Norfolk, Virginia.

Civilian Paints Curtailed

Curtailed production of paints for essential civilian requirements, caused by increased shortages of rosin, drying oils and lead, was discussed at a recent meeting of the Paint, Varnish and Lacquer Industry Advisory Committee.

The committee estimated that production of paints for civilian needs in the second quarter of 1945 would be approximately 55 per cent of the output of the corresponding quarter last year. However, it was the opinion of the committee that despite the low production of civilian paints, the shortage would not be felt immediately, due to relatively normal inventories in the hands of dealers and distributors.

COMPANIES

Du Pont Completes Neoprene Unit

Completion of a new unit at the Du Pont-operated neoprene plant here has been announced by E. W. Thompson, plant manager, who said the expanded facilities will step up production of this high priority synthetic rubber by approximately 26 per cent to an annual volume of 60,000 tons.

The new addition, constructed and equipped at a cost of $7,000,000, is the fifth in a series of units, which have been rushed to completion to meet a rapidly increasing demand for neoprene.

More than 2,000 men and women are working at the plant, which from the standpoint of number of employees is the largest of all government-owned synthetic rubber plants. Neoprene has been in production at the original plant at Deepwater Point, N. J., since 1932. Construction of the Louisville plant was begun in June, 1941, and the first unit started operation in October, 1942.

Hewitt Rubber Aids Mexican Expansion Program

The Hewitt Rubber Corporation of Buffalo has announced a working agreement with Fabrica de Artefactos de Hule Eureka, S. A., the largest manufacturer of mechanical rubber products in Mexico.

Terms of the agreement, as stated by President Thomas Robins, Jr., of Hewitt, and General Manager Manuel Escandon of Eureka, specified that Hewitt will supply mechanical equipment and technical "know-how" to increase the output of the Mexico City company. In consideration of this assistance, Hewitt acquires a preferred stock interest in Eureka, plus annual service fees.

Programs similar to the Hewitt-Eureka combine are strongly urged by the governments of both countries. The appli-

METHYL ISOBUTYL KETONE

A medium boiling solvent freely available in substantial quantities, subject to allocation.

SPECIFICATIONS AND PROPERTIES

Purity	Minimum 99% by weight
Specific Gravity 20°/20°C	0.800 to 0.804
Boiling Point at 760 mm	115.9°C
Distillation Range	Below 114°C. None
(A.S.T.M. D268/33)	Above 117°C. None
Weight	6.68 lbs. per gallon at 20°C
Flash Point, Tag Open Cup	81°C
Tag Closed Cup	64°C
Vapor Pressure at 20°C	15.2 mm. Hg.
30°C	26.2 mm. Hg.
40°C	43.5 mm. Hg.
Evaporation Rate (n-Butyl Acetate 1.0)	1.5
Latent Heat of Vaporization	87 gm. col. per gm.

• • •

METHYL ISOBUTYL KETONE is a water white liquid, boiling at 116° C. It is used as a solvent, lacquer and thinner component. With ethylene dichloride a solvent for cellulose acetate. Dissolves many natural gums, ethyl cellulose and benzyl cellulose. Miscible with mineral and vegetable oils. Solvent for vinyl resins. Denaturant.

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cation of U. S. industrial methods, said Escandon, will eliminate many handicaps of production in Mexican factories and will result in higher volume and lower costs. Working conditions and quality of products will be improved.

An important phase of the agreement provides that key men and departmental heads of Hewitt will, from time to time, visit Mexico to train Eureka technicians in modern methods of manufacture.

Immediate goal of the tie-up with Hewitt is to raise Eureka's production to 2,000 tons in 1946 and to reach a total of 4,000 tons per year by 1948. This would represent about five times the current output. This increase is warranted by the higher purchasing power expected to accompany the increased industrialization in Mexico.

First DPC Carbon Unit Starts Production

Robert I. Wishnick, president of Continental Carbon Company, has announced the start of operations at the government-financed channel type carbon black plant designed to help meet emergency requirements for the product in the synthetic rubber industry. This plant is the first of the Defense Plant Corporation units to start production.

A second plant, further increasing channel black production capacity, is being rushed to completion at Witco, New Mexico, by the Panhandle Carbon Company. The two plants when completed will add capacity for 45,000,000 pounds of channel black per year. The production of Continental and Panhandle Carbon Companies is marketed through the Witco Chemical Company.

U. S. Rubber Develops 53 Synthetics in 1944

In the three synthetic rubber plants operated by the United States Rubber Co. during 1944, 53 different types of synthetic rubber were produced. Eight of these have been adopted for regular use in the manufacture of rubber insulation of electric wire and cable, porous rubber storage battery separators, asbestos sheet packing and pressure sensitive adhesives. During the past year 14,000,000 pounds were made for these special purposes.

Production of special synthetic rubber latex now exceeds 1.5 million pounds a month at one of these plants. By the end of this year the output is expected to reach 2 million pounds a month as compared with an average of less than one million in 1944.

Chemical Company Earnings Reports Summarized

Company	Period	Taxes 1945	Taxes 44	Net Profit 1945	Net Profit 44
Abbott Laboratories Inc.*	Year to Dec. 31	.....		$3,039,512–	$3,285,508
Air Reduction Co. Inc.	Year to Dec. 31	$7,515,129–	$9,550,853	$5,877,576–	$6,544,789
American Cyanamid Co. & Subsidiaries	Year to Dec. 31	$12,000,000–	$20,000,000	$6,660,140–	$6,653,118
American Home Products Corp.	Year to Dec. 31	$7,594,285		$5,132,410–	$4,896,244
American Viscous Corp.	Year to Dec. 31	$13,563,500–	$14,282,000	$5,129,940–	$6,352,223
Colgate-Palmolive-Peet Co.	Year to Dec. 31			$7,002,483–	$6,616,696
Freeport Sulphur Co.	Year to Dec. 31			$2,558,710–	$2,483,465
General Aniline & Film Corp.	Year to Dec. 31	$14,386,000–	$8,989,267	$4,813,000–	$4,062,527
B. F. Goodrich Co.	Year to Dec. 31	$59,163,000		$12,015,842–	$11,584,501
Industrial Rayon Corp.	Year to Dec. 31	$2,106,975		$1,403,287–	$1,642,083
International Nickel Co.	Year to Dec. 31	$19,570,349–	$20,359,089	$26,927,652–	$31,127,204
McKesson & Robbins Inc.	6 mos. to Dec. 31	$5,874,231		$2,258,892	
National Lead Co. & Subsidiaries	Year to Dec. 31	$10,740,381		$8,393,754	
National Oil Products Co.	Year to Dec. 31	$1,133,963–	$949,927	$504,259–	$475,123
Schenley Distillers Corp.	6 mos. to Feb. 28	$34,688,954–	$25,471,000	$12,678,229–	$8,048,158
Sinclair Oil Corp.	Year to Dec. 31	$22,661,215–	$20,349,673	$27,367,794–	$23,083,709
Texas Gulf Sulphur Co.	Year to Dec. 31			$9,620,172–	$7,965,732
United Carbon Co. & Subsidiaries	Year to Dec. 31	$1,075,000		$2,232,286	

Pitzer Joins Foote Mineral

Dr. E. C. Pitzer, recently associated with the Catalyst Research Corp. of Baltimore, Md., where he was engaged in high vacuum pyrotechnic investigation, has moved to the Foote Mineral Co. He is heading the inorganic research group.

Cyanamid Forms New Department

American Cyanamid Co. has announced the formation of a new department to handle textile resins. R. E. Sumner, who has been department sales manager of dyestuffs for Calco Chemical Division, will head the department as manager. Headquarters are in Bound Brook, N. J.

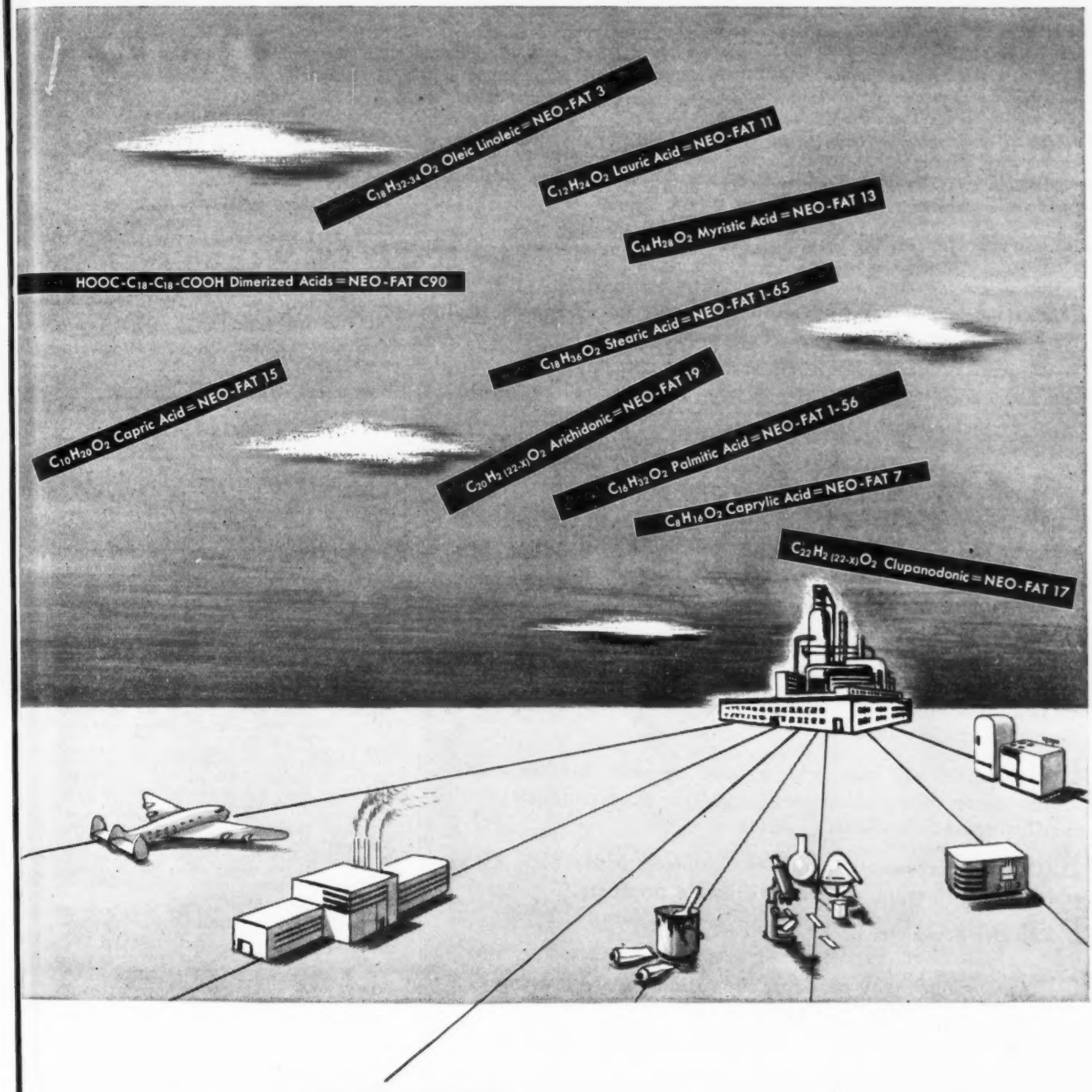
Joliet Chemicals Plans Expansion

Joliet Chemicals, Ltd., has made known plans to expand production facilities for silica gel. The company is said to be producing 1,250,000 pounds monthly and plans the erection of a $500,000 manufacturing unit which will result in a 2,000,000-pound-a-month production.

A. C. C. L. Acquires New Members

Election of four new members to the American Council of Commercial Laboratories has been made known by A. J. Nydick, executive secretary of the Council. The new members are:

The Smith-Emery Company, Los Angeles, Calif.; Southern Testing Labora-


$C_{18}H_{32-34}O_2$ Oleic Linoleic = NEO-FAT 3
$C_{12}H_{24}O_2$ Lauric Acid = NEO-FAT 11
$C_{14}H_{28}O_2$ Myristic Acid = NEO-FAT 13
HOOC-C_{18}-C_{18}-COOH Dimerized Acids = NEO-FAT C90
$C_{18}H_{36}O_2$ Stearic Acid = NEO-FAT 1-65
$C_{10}H_{20}O_2$ Capric Acid = NEO-FAT 15
$C_{20}H_{2\,(22-X)}O_2$ Arichidonic = NEO-FAT 19
$C_{16}H_{32}O_2$ Palmitic Acid = NEO-FAT 1-56
$C_8H_{16}O_2$ Caprylic Acid = NEO-FAT 7
$C_{22}H_{2\,(22-X)}O_2$ Clupanodonic = NEO-FAT 17

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tories, Birmingham, Alabama; Twin City Testing & Engineering Lab, St. Paul, Minnesota, and The Twining Laboratories, Fresno, Calif.

These new members, like other members of the Council throughout the United States, are independent commercial laboratories rendering services designed to insure unbiased, scientifically objective investigations in every phase of chemistry, physics and engineering.

Company Notes

E. M. SERGEANT PULP & CHEMICAL CO., INC., manufacturers, importers and distributors of chemicals and oils, has moved its offices from the Empire State Building to 7 Dey St., New York.

THE GAS PROCESSES DIVISION of THE GIRDLER CORPORATION, Louisville, Ky., has opened a New York office at 150 Broadway. It will be managed by J. D. Gordon, eastern representative of the firm.

FRANCIS CHILSON, industrial consultant, has opened research offices in the Harwood Building, Scarsdale, N. Y.

CONSUMER'S IMPORT CO., INC., has removed its offices from 342 Madison Ave., New York, to the Empire State Building.

BELL TELEPHONE LABORATORIES, INC., is planning to double the size of its laboratory at Murray Hill, N. J., as soon as war conditions permit. It is estimated that the cost will be $2.5 million dollars and the number of employees will be approximately 2,000.

R. J. PRENTISS & Co. has bought a group of one- and two-story buildings on Doremus Avenue, Newark, N. J., which will be operated in addition to present facilities in Brooklyn, N. Y.

COASTAL CHEMICAL CO., with offices at 739 Bryant St., San Francisco, Calif., has changed its name to Coastal-Chem., Ltd. The company was formed in 1944 by H. J. Fouts who had previously been associated with the sales department of the Shell Oil Co.

Aromatic Chemicals

IN INDUSTRY

THE field of Aromatic Chemicals in Industry has widened considerably in recent years.

NO longer is the use of Perfumes restricted to the Soap, Cosmetic and Perfume Manufacturer.

PERFUMES are now widely used by such diverse manufacturers as: the rubber industry, the paper industry, the textile industry and many others.

FURTHER research is constantly being made both by us and by manufacturers of many diverse products.

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Among our many products the following are proving useful in numerous industries:

Butyl Phenyl Acetate
Lignin Vanillin
Veratraldehyde
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Phenyl Acet Aldehyde Di Methyl Acetal
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Aromatics Division
GENERAL DRUG COMPANY
125 BARCLAY STREET NEW YORK 7, N. Y.
9 S. Clinton Street, Chicago 6 1019 Elliott Street, W., Windsor, Ont.

NEWS *of* SUPPLIERS

MAGUIRE INDUSTRIES, INC. recently acquired the **COLUMBIA MACHINE WORKS, INC.** as a subsidiary. Robert Maguire, president of the larger company will assume the same office in the subsidiary, with Thomas Meloy continuing as vice president and general manager of Columbia.

C. E. Mason has been appointed technical director of the **BRISTOL COMPANY,** Waterbury, Conn., manufacturers of automatic control and recording instruments, according to an announcement made by L. G. Bean, vice president in charge of engineering and sales.

Emery J. Stevenson has been elected secretary-treasurer of **WHEELCO INSTRUMENTS COMPANY,** makers of electronic control instruments. Mr. Stevenson comes to the industrial instrument firm after 25 years with Chicago financial houses. He was formerly an investment counsellor with Moody's Investors Service, in charge of the statistical department of Lamson Bros. & Co., and did research work for A. G. Becker & Company.

FOOD MACHINERY CORPORATION has purchased the **DAYTON-DOWD CO.,** large independent pump company, Quincy, Ill., and will make it a branch of its Peerless Pump division, Los Angeles, under direction of Clarence M. Frazier, vice president.

Henry J. McKenzie, who has been assistant manager of Peerless Pump division of Food Machinery Corporation, has been named manager of the new branch.

F. H. Herndon, manager of **LINK-BELT COMPANY'S** stoker division, has announced the appointment of Clarence H. Schuettenberg as sales manager of this division. He will make his headquarters at the Link-Belt Caldwell plant, 2410 West 18th St., Chicago.

Formation of a Canadian subsidiary of **THE BALDWIN LOCOMOTIVE WORKS** to market in Canada such Baldwin products as turbines, water wheels, hydraulic presses, power tools and Diesel engines from headquarters to be opened soon in Toronto, has been announced by Ralph Kelly, president of the parent company.

Other officers of the company, elected at an organization meeting held in Toronto, are W. Horace Holcomb, vice-president; W. N. Brownlie, managing director; H. D. Humphreys, secretary and treasurer; and T. E. McFalls, assistant secretary and assistant treasurer. All except Brownlie are officers of the parent company.

H. K. PORTER COMPANY, Inc., has appointed J. C. Hamilton as service engineer for Quimby Pumps and Fort Pitt Steel Castings in Chicago and surrounding territories, William W. Calihan, Director of Sales, has announced.

Mr. Hamilton was previously with the sales department of Pittsburgh Equitable Meter Company. He will make his headquarters at 332 South Michigan Avenue, Chicago, Illinois.

INDUSTRIAL LINING ENGINEERS, INC., have changed the address of their offices, laboratories, and shops from 1960 Westhall Street, Pittsburgh, Pa., to Edgeworth, Pa. This move was necessitated by the need for more facilities to take care of the increasing demand for corrosion and abrasion resistant equipment linings of synthetic rubber and plastics designed and applied by the company. They have also acquired railway siding facilities which will expedite the lining of tank cars and other heavy industrial equipment.

J. D. Grothe has been appointed by **THE DORR COMPANY** to head its newly-created technical division of the sales department. The new division co-ordinates contract engineering orders and serves in a technical advisory capacity to the Company's field staff divisions. Mr. Grothe previously held executive posts with the company in London, Paris, and The Hague.

THE JOHNSTON & JANNINGS CO., Cleveland, Ohio, has announced the appointment of Murray Russell, formerly sales manager of the company's Oceco Division, as manager of the office newly established in Washington, D. C. C. J. Van Landeghem, formerly Sales Manager of the Philip Carey Mfg. Co., Cincinnati, is new Sales Manager of the Oceco Division.

Charles A. Packard has been elected vice president and controller of the **WORTHINGTON PUMP & MACHINERY CORP.** Mr. Packard is also vice president of the Controllers Institute of America and chairman of the accounting council of the Machinery of Allied Products Institute.

Ray G. Peterson has been made a northeastern district representative of the **THERMEX DIVISION** of **THE GIRDLER CORPORATION** with offices at 150 Broadway, New York. He will cover all of the New England states.

Mr. Peterson, prior to joining The Girdler Corporation's Thermex Division in November, 1944, was with the National Carbide Corp.

W. R. Wood, vice president in charge of the **GAS PROCESS DIVISION OF THE GIRDLER CORPORATION,** has announced the appointment of J. D. Gordon as eastern representative, with offices at 150 Broadway, New York. He assumed his new duties on April 1. Mr. Gordon became associated with The Girdler Corporation in 1939.

BETHLEHEM STEEL CO. has acquired all the stock of Petroleum Equipment Co. and Petroleum Equipment International, both California corporations. Bethlehem plans to expand Petroleum Equipment Co., with emphasis on refinery and oil field drilling equipment.

NATIONAL GYPSUM has purchased the limestone deposit of Kimbalton Lime Co., near Bluefield, Va.

PRESSED STEEL TANK CO., William E. Coakley, who has been with the company since 1918, has been elected vice president and director.

H. K. PORTER COMPANY, INC., has announced the election of S. B. Heppenstall, Jr., as vice president. He will make his headquarters in the general offices of the Porter Company in Pittsburgh. Mr. Heppenstall was formerly vice president in charge of sales of the Heppenstall Company.

C. C. Brumleve, sales manager of the **THERMEX DIVISION** of **THE GIRDLER CORP.**, Louisville, Ky., has announced the appointment of Earle C. Call as eastern district representative, with offices at 150 Broadway, New York. He formerly had charge of Thermex sales in the Midwest.

Before joining Thermex in May, 1943, he was associated with the Russell B. Moore & Company, consulting engineers, Indianapolis.

THE BRIGGS CLARIFIER CO., of Washington, D. C., has announced the appointment of another industrial distributor, LaGrave and Co., 812 1st National Bank Annex, Mobile 6, Alabama. They will handle distribution of Briggs products in central and southern Mississippi in southern Alabama, and in northwestern Florida.

MIXING EQUIPMENT CO., INC., of Rochester, New York, have announced the addition of a new representative. He is George R. Mellema and his offices are located at 1024 Plymouth Building, Minneapolis 2, Minn. His territory will include Minnesota, North Dakota, South Dakota and the extreme Western section of Wisconsin. For the past twelve years he has been a manufacturers' agent in this territory and has specialized in heating and ventilating equipment, steam and mechanical specialties.

THE FULTON BAG & COTTON MILLS, with headquarters in Atlanta, Ga., have purchased the assets of the Grimes Bag Company at Denver, Colorado. The company took possession on April 2. Mr. Eugene Revelle, for many years in charge of the Denver Office, will be the manager.

C. K. McArthur has been promoted by **THE DORR COMPANY** to manager of sales covering United States, Mexico, Canada, Newfoundland and Alaska. For the past two years Mr. McArthur has been manager of the company's metallurgical division. His headquarters continue to be in New York.

Mr. McArthur joined The Dorr Company as a sales engineer in 1926.

ASSOCIATIONS

Proprietary Assn. Makes Staff Changes

A. K. Barta, for the past five years a member of the staff of the Proprietary Association of America, Washington, D. C., was elected secretary and treasurer at a meeting of the executive committee in the Biltmore Hotel, New York, it has been announced by Dr. Frederick J. Cullen, executive vice-president. Mr. Barta succeeds Charles P. Tyrrell, who has retired after serving the association for 38 years. Before joining the Proprietary Association, Mr. Barta practiced law in Washington.

James Hill, Jr., association president, who presided at the meeting, announced the following changes in the executive committee: Joseph D. Bohan, vice-president of Sterling Drug, Inc., succeeding Harold D. Thomas, now with Pedlar and Ryan, New York advertising agency; S. Reising, president, Guild Company, Ruppert, Vt., succeeding Thomas Singleton, formerly with the Murine Company, Chicago, now with Sherman and Marquette, Chicago advertising agency; and John Norton, vice-president of the Lambert Pharmacal Company, St. Louis, Mo., succeeding Robert L. Lund, who recently re-

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tired as vice-president of that company.

The executive committee voted to hold the annual May convention by mail, as well as the meetings of the scientific and veterinary sections, customarily held during this month.

Farm Chemurgic Re-elects McMillen

Wheeler McMillen, editor of *The Farm Journal,* has been re-elected president of the National Farm Chemurgic Council. John Ticknor, New York, has been re-elected assistant to the president and treasurer. Ernest L. Little, Columbus, Ohio, has been re-elected managing director and secretary.

Vice-presidents elected were: Representing industry, Howard Huston, assistant to the president of the American Cyanamid Company, New York; representing science, Roger Adams, head of the Department of Chemistry of the University of Illinois, Urbana, Ill.; representing agriculture, Louis J. Taber, president of Farmers and Traders Life Insurance Company, Syracuse, N. Y.

Ceramic Society Elects Tefft President

C. Forrest Tefft, president, Claycraft Company, Columbus, Ohio, was inaugurated as president of the American Ceramic Society, Inc., at the 47th Annual Meeting April 16. Mr. Tefft has served as treasurer and vice-president.

J. Edward Hansen, director of service, Ferro Enamel Corp., Cleveland, Ohio, became vice-president. John D. Sullivan, assistant to the director, Battelle Memorial Institute, was re-elected to the position of treasurer. Mr. Sullivan is a research engineer who is associated with the War Metallurgy Committee. He has served for several years as treasurer of the society. Ross C. Purdy is general secretary and editor, a position which he has held for twenty-five years.

On account of the war restrictions on travel, only the trustees, committee chairmen and members of the Upstate New York section were present at this meeting.

Stewart to Manage Pittsburgh Plate Branch

I. G. Stewart has been appointed manager of the new San Francisco sales office of the Pittsburgh Plate Glass Company's Columbia Chemical Division, which recently acquired the Pacific Alkali Company of Bartlett, California.

Textile Chemists Study Detergents

The Northern New England Section of the American Association of Textile Chemists and Colorists met at the Andover Country Club, Andover, Mass., May 25 to discuss "Synthetic Detergents versus Soap."

PERSONNEL

Mekler Becomes I. I. T. Consultant

L. A. Mekler, combustion engineer and member of the engineering and development department for Universal Oil Products Company since 1927, has assumed a new position as engineering consultant to the Institute of Gas Technology and the Armour Research Foundation of Illinois Institute of Technology.

On leave of absence from Universal Oil Products Co. from April 1942 to No-

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vember 1943, Mr. Mekler served with the Petroleum Administration for War in Washington. As petroleum consultant to the foreign division, he was in charge of Russian requirements for petroleum refining equipment supplied to the U.S.S.R.

Hercules Research Appoints Two

Two appointments in Hercules Powder Company's research department have been announced by Dr. Emil Ott, director of research. Dr. Robert W. Cairns will be assistant director of research and Dr. Raymond F. Schultz will direct the company's experiment station.

Dr. Cairns has had 10 years of experience with the company as research chemist, group leader and director of the experiment station.

Dr. Schultz, who has been acting director of the experiment station since January 1, of this year, joined Hercules in June 1941 as technical assistant to Dr. Ott.

Prior to joining Hercules, Dr. Schultz was associated with E. I. du Pont de Nemours and Company as a research chemist and from 1937 to 1941 as assistant professor of chemistry at Lehigh University.

Noll Moves to Houdry From Socony-Vacuum

Henry D. Noll has been named manager of the project analysis department for Houdry Process Corp.

Mr. Noll was employed by Socony-Vacuum Oil Company, Inc., for nineteen years. Just prior to coming to Houdry, Mr. Noll was in New York with the manufacturing department of Socony-Vacuum on special wartime assignments. He is a member of the Catalytic Cracking Subcommittee of the Aviation Gasoline Advisory Committee.

Shine and Stevens Join General Aniline

General Aniline & Film Corporation has announced the appointment of William M. Shine and Dr. Philip G. Stevens to its development division. Mr. Shine was formerly group leader in charge of research and chemical development for the Plastics Department of General Electric Company, Pittsfield, Massachusetts.

Dr. Stevens, recently instructor at Yale University, and co-discoverer of the new perfume fixative from muskrats, "Musc Zibata," was formerly assistant professor of organic chemistry at McGill University.

DCR Promotes Starr

Appointment of Milton Starr as assistant vice chairman of the Office of Civilian Requirements was announced today by J. A. Krug, Chairman of the War Production Board. Mr. Starr has been special assistant to William Y. Elliott, WPB vice chairman for OCR, since early in 1943.

In his new position, Mr. Starr will have supervision of the following Government Bureaus, which includes the Government Requirements Division; Government Projects, Equipment and Supplies Division, and the Prison War Programs Office; the Forest Projects Division; Chemicals, Drugs Health Supplies Division and the Consumer Fuels Division.

Winthrop Manager Freed from Japs

James G. Thomas, manager of the Philippines branch office of the Winthrop Chemical Company, Inc., has returned to this country after liberation from the Santo Tomas prison where he was confined by the Japanese with his wife and daughter, Jayne, 5, from Jan. 7, 1942, to Feb. 4, 1945. Mr. Thomas was first assigned to the company's office in Hawaii in 1938 before his transfer to the Philippines.

Baker Increases Research Staff

In the enlargement program of its organic research staff under the direction of Dr. Joseph R. Stevens, the J. T. Baker Chemical Co., has made three additions to its staff. John Burton, for the past six years with Heyden Chemical Co., has been appointed design chemical engineer. Augustus Buzas, previously with Merck & Co., Inc., and Dr. Ralph Moore, of Arthur D. Little, Inc., have joined the staff as development engineer and research chemist, respectively.

In addition to these appointments, Dr. Stevens has named Jeanne Ossent as technical librarian. Miss Ossent was previously employed by the Rohm and Haas Company.

Bureau of Mines Appoints Merrill

The appointment of Charles White Merrill, a mining engineer, as chief of the Metal Economics Division of the Bureau of Mines has been announced by Dr. R. R. Sayers, Director of the Bureau.

Associated with the Bureau since 1928 when he joined the staff of the Economics and Statistics Branch as a mineral economist, Merrill has served as supervising engineer of the Bureau's Economics and Statistics office at San Francisco since 1933. He has written extensively on the economics of mining in the Western States, particularly on gold, silver, copper, lead, and zinc, and has been a regular contributor to the Minerals Yearbook, the Bureau's annual review of mineral industries of the United States.

Mr. Merrill succeeds Thomas H. Miller,

(*Turn to page 1032*)

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CHEMICAL SPECIALTIES NEWS

Devoe & Raynolds Acquire New Units

Acquisition by Devoe & Raynolds, paint manufacturers, of Trucson Laboratories, Inc., and Beckwith-Chandler Co., was announced recently by Elliot S. Phillips, president of the Devoe & Raynolds organization.

Trucson Laboratories is a Detroit firm which manufactures damp- and waterproofing products for steel, brick, and concrete. Other products are a cement roofing tile and a system of color-harmonized industrial finishes. R. A. Plumb, president, becomes president of the Trucson division.

The Beckwith-Chandler Co., Newark, N. J., manufacturers specializing in railroad and industrial product finishes, will enable Devoe & Raynolds better to serve eastern markets. Clarence W. Slocum will continue as president of the Beckwith-Chandler division.

Glyco Products Appoints Schwartz

Edward Schwartz, formerly in charge of chemical production for the James Hood Co., Philadelphia, has been placed in charge of technical service throughout eastern Pennsylvania and southern New Jersey for Glyco Products Co., Brooklyn.

Rolstad Heads Insecticides For Michigan Chemical

Michigan Chemical Corp., Saint Louis, Michigan, has announced the appointment of Marvin J. Rolstad as manager of its Insecticide Division. Mr. Rolstad has had fifteen years' experience in many branches of the insecticide business, having been in the employ of McLaughlin Gormley King Company, Rohm and Haas Company, U. S. Industrial Chemicals, Skol Company and Geigy Company.

Chicago Drug & Chemical Elects Officers

Harry E. Dunning, Albert Verley & Company, was elected president of the Chicago Drug and Chemical Association at its 45th Annual Meeting. Other newly elected officers are Dale F. Ruedig, Eli Lilly & Company, vice-president; John L. Thomas, Joseph Turner and Company, secretary; and Wilson I. Doan, Dow Chemical Company, treasurer.

Newly elected directors to serve for a term of two years are: Edgar E. Brand, L. Sonneborn Sons, Inc.; Ed Davis, Davis & Davis, Inc.; A. L. Starshak, Walgreen Company, and Charles R. O'Malley, Professional Journals. Directors remaining in office are: James M. Murphey, Solvay Sales Corp., Gerald F. Pauley, Monsanto Chemical Company, Bruce Puffer, Kimble Glass Company, and Talmadge B. Tribble, Magnus Mabee and Reynard, Inc.

Stock Resigns From WPB Post

Fred J. Stock, chief of the Drug and Cosmetic Section, Chemical Division, War Production Board, tendered his resignation effective May 15. John T. Batson, who is associated with the same division, succeeded him.

Buck Elected President of Allied Drug and Cosmetic Association

Gordon E. Buck (above), Standard Oil Co. of Indiana, was recently elected president of the Allied Drug and Cosmetic Association. Other Officers elected were M. G. deNavarre, vice-president; A. S. Bedell, Beauty Counselors, Inc., secretary; and Stewart Cowell, J. T. Baker Chemical Co., treasurer. Donald Melville, Frank W. Kerr Co.; E. E. Van Allsberg; and Geoffrey Snider, Commercial Solvents Corp., comprise the executive committee.

Synthetic Flavors and Odorants

Bristol-Myers Company, Hillside, N. J., has announced the establishment of a project at Southern Research Institute for investigations in the field of organoleptic substances. Owing to war shortages, manufacturers of drugs and cosmetics have become increasingly interested in developing new sources of supply for flavoring and perfume ingredients. It is expected that synthetics will assume greater importance as supplements for blending with products of natural origin.

MacDonald Named Comptroller of National Starch Products

National Starch Products, Inc., announces the appointment of Stanley E. MacDonald as Comptroller.

Mr. MacDonald was recently associated with the American Sugar Refining Co., as vice-president of one of their subsidiaries, The Brooklyn Cooperage Company, and previously held the office of assistant treasurer of the General Time Instruments Corporation.

American Disinfecting Co. Changes Name

Officials of the American Disinfecting Co., Inc., have announced that the company will henceforth be known as Adco, Inc.

They emphasize that the change is in name only; the management, ownership, and personnel remain the same. Since the firm has been known for years as the "Adco" company, it was decided to make the abbreviation official.

Fertilizer Demand Will Continue

The results of a questionnaire sent out by the National Fertilizer Association augur well for the increased use of fertilizer after the war.

The survey showed that, although less than a third of the farmers questioned have more acres under cultivation, over half of them are fertilizing more acres than before the war. Over two-thirds of them plan to use more fertilizer next year, and in the postwar period, even in the face of a moderate decline in farm prices, 96 per cent indicated that they did not intend to reduce their fertilizer expenditures.

DDT for Budworm Control

Most of the output of the new DDT plant of Naugatuck Chemicals, Ltd., Canada's first DDT plant, is being supplied to the Ontario Department of Lands and Forests for the large-scale spraying of timber stands in an effort to curb the widespread destruction being wrought by the spruce budworm.

To date the Ontario government has sprayed the heavily wooded, and seriously infested, Algonquin Park area of northern Ontario by autogyro, and results have been observed jointly by officials of the U. S. and Canadian Departments of Agriculture.

The autogyro spraying treatment proved to be remarkably effective in an insecticidal sense, with virtually complete

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extermination of budworms, budworm moths, and other insects, but, in addition, it took a heavy toll of invertebrates, especially crayfish. Many minnows and some trout—those that ate poisoned insects—were also killed, as well as some snakes and frogs. Slight damage to broadleaved trees was also reported, but birds, chipmunks, mice, beaver, and deer were apparently unharmed.

However, in spite of the obvious destruction of beneficial insects and some invertebrates, as well as pests, the opinion of the seven-man committee set up to study the problem is that "repopulation of a small area by beneficial insects and other forms of life destroyed by the spray is a much faster process than replacement of the forest destroyed when an insect infestation gets out of control."

In an extension of its program the provircial government is now spraying, from especially equipped PBY's, a 100-square-mile area of the Lake Nipigon country, north of Fort William, Ont., where the timber stands are threatened with complete destruction by the spruce budworm. This experiment is progressing at press date, and, as yet, detailed observations of the results are not available.

Evaluation of Paint Exposure Tests

A simplified method for the evaluation of paint exposure tests will have far-reaching effects in determining the value of such tests for postwar use. Dr. E. W. McMullen, technical director of the Eagle-Picher Lead Co., told the New York Paint and Varnish Production Club at a recent meeting of the organization.

This method, developed and described by Dr. McMullen, for the evaluation of exposure panels and other painted surfaces subjected to outdoor exposure gives the final rating of a panel as a single figure. This value may be used for comparison of paints at any time during their life, he said. It may also be plotted as a graph rating the paint throughout its life. A nomograph or chart in the form of a durable card has been developed as a means of obtaining these ratings quickly. Dr. McMullen also outlined a method for determining suitable repaint periods.

Prizes Awarded for Glycerine Uses

Hobert D. Young, Diesel engineer in the Engine Laboratory of the Sinclair Refining Company, of East Chicago, won first prize in the competition instituted by the Glycerine Producers' Association for the best list of uses of glycerine, actual or recommended, not covered in the Association's booklet "Nothing Takes the Place of Glycerine—1583 Ways to Use It."

Mr. Young listed glycerine uses as a penetrating oil for Diesel engine injectors, as a lacquer and gum solvent on pistons of gasoline and Diesel engines, as a coolant for high temperature internal combustion engine operation, and for other industrial purposes. Other prize winners listed industrial uses also.

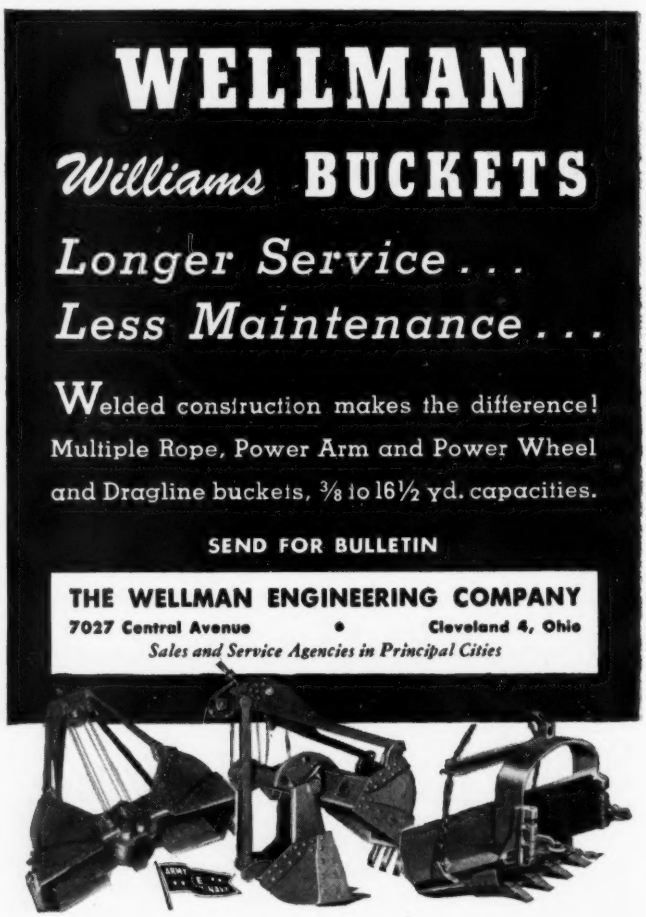
The purpose of this contest was to find practical uses for glycerine in addition to those included in the booklet.

Linseed Bodying Discussed

Bodied linseed oil similar to bodied tung oil, synthetic wetting agents, and larger varnish kettles with adequate fume disposal, are some of the objectives to be obtained by research, according to the panel discussion on the heat bodying of linseed oil staged by the New York Paint and Varnish Production Club.

The present trend is toward larger kettles for oil bodying and resin making in order to reduce costs, according to S. T. Russell, chemical engineer of the Blaw Knox Company. Other trends to be observed in the postwar period are more intensive agitation, bodying under vacuum, better fume control, continuous operation (which will be difficult in the paint industry) and better pilot plant equipment.

The comparative costs of oil, gas and electricity for kettle heating were presented by Mr. Russell, who showed that oil generally costs least, gas somewhat more, and electricity most of all.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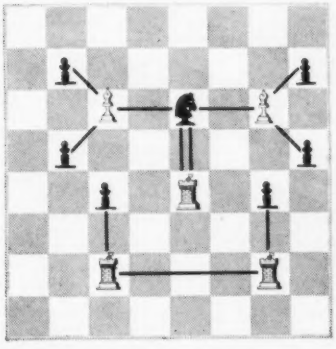

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Personnel News

(*Continued from page 1027*)

who recently was made assistant chief of the Economics and Statistics Branch of the Bureau of Mines.

G. E. Promotes Doell and Giblin

Philip E. Doell, in charge of resin and insulation material sales in the east central district of the General Electric Co. since 1936, has been appointed district manager of the newly formed chemical department in this district, according to an announcement made by D. S. McKenzie, general sales manager of the department. Mr. Doell's headquarters will remain in Cleveland.

T. E. Giblin, who since 1942 has been in charge of plastics sales for the General Electric Co. in the central district with headquarters in Chicago, has been appointed manager of the department for that district. Mr. Giblin's headquarters will remain in Chicago.

Woodard Advanced By Penn Salt

A. S. Woodard has been named assistant chief engineer of the Pennsylvania Salt Manufacturing Company, according to Y. F. Hardcastle, vice-president. Prior to this appointment, Mr. Woodard was senior chemical engineer.

Agricultural Research Appoints Lambert

Dr. W. V. Lambert has been made Assistant Administrator of Agricultural Research. He came to Washington from Lafayette, Ind., where he has been associate director of the Purdue University Agricultural Experiment Station since 1940. He will fill the post left vacant in the Administration when P. V. Cardon was appointed administrator early in March.

Water Chemist Joins Hall Labs

Hagan Corporation, Hall Laboratories and Calgon, Inc., today announced that Russell Lang, formerly engaged in water chemistry in the paper field, has joined the Hall Laboratories field service staff at Los Angeles, under Ray Sullivan. He will devote his principal efforts to boiler water conditioning aboard merchant marine vessels.

Hines to Manage Du Pont Cellophane

Thomas L. Hines, general assistant manager of the Cellophane Division, has been appointed manager, it has been announced by E. I. du Pont de Nemours & Company. He succeeds John E. Hatt, who recently died of a heart attack.

Mr. Hines was named assistant general manager of the Du Pont Cellophane Company in 1930. When this company became the Cellophane Division of the Rayon Department, he was made assistant manager and recently was made general assistant manager.

Robert L. Richards will continue as assistant manager of the division under Mr. Hines.

Du Pont Announces Personnel Changes

Ki Williams, plant manager of the acetate rayon plant of du Pont de Nemours & Co., at Waynesboro, Va., for the last four years, is being transferred to Wilmington, Del., as assistant to A. W. Frame, director of acetate rayon production. W. T. Wood, plant manager on special assignment in the Nylon Division, succeeds Mr. Williams at Waynesboro.

Wendle to Manage Hercules New York Naval Stores

Herbert M. Wendle, of the Wilmington office, has been named manager of the Naval Stores Department office in New York, according to an announcement by the Hercules Powder Co. Mr. Wendle, who has been a sales supervisor of naval stores products since 1939, is replacing George C. O'Brien on the latter's retirement after 50 years of service. Mr. O'Brien had formerly been identified with the Laflin & Rand Powder Co.

(*Turn to page 1038*)

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WAR REGULATIONS SUMMARY

ACETONE AND DIACETONE—(WPB)—Order M-352 governing these chemicals was revoked. They were transferred to Schedule 102 of Order M-300.

BENZYL BENZOATE AND CHLORIDE.—(WPB)—These were placed under allocation June 1 by Schedule 105 to Order M-300. Limited quantities will be available for pharmaceutical use.

CHANNEL CARBON BLACK—(OPA)—Amendment 4 to Supplementary Regulation 14F permits higher than normal costs for small quantities from the DSC pool.

FUEL AND FUEL OIL—(PAW)—Amendment 7 to Petroleum Administrative Order 1 relaxes restrictions on inventories of large consumers.

LIME—(OPA) An increase of 65 cents per net ton in the f.o.b. plant ceiling prices for all building, chemical, and industrial lime, except agricultural lime, produced in Va., N. C., S. C., Ga., Ala., Tenn, Miss., and La. was granted by Amendment 77 to Order A-1 under Section 1499.159b of MPR 188.

MALEIC, FUMARIC, "CARBIC," AND PENTAERYTHRITOL OILS AND RESINS—(WPB) Schedule 103 of Order M-300 governs allocation of these protective coating materials. The small-order exemption is 125 lbs. in the aggregate per month. Maleic acid and anhydride, fumaric acid, and pentaerythritol are controlled by Schedules 68, 104, and 11 respectively. Allocation was initiated June 1.

NAPHTHENIC ACID AND NAPHTHENATES—(WPB) Use of naphthenate driers for all military paints is prohibited, beginning with June allocations, with the exception of specifications AN-TT-P-656b and USA 3-201 for zinc chromate primers.

PERCHLORETHYLENE—(WPB) Amendment of Schedule 95 of Order M-300 tightens allocation, channeling all to military needs.

PHENOLIC RESINS—(WPB) Resorcinol resins were added to Schedule 87 of Order M-300. Restrictions were tightened on resins containing *p-tert.*-butyl- and *p-tert.*-amylphenol.

PLASTICIZERS — (WPB) Dicarbitol phthalate was added to Schedule 63 of Order M-300. Amendments to Schedules 61 and 63 make it necessary for producers requesting phosphate and phthalate plasticizers for wire and cable insulation to specify the type of wire for which they are required.

SOAPS AND CLEANERS—(OPA) Amendment 5 to Maximum Price Regulation 391 permits manufacturers of low-priced materials suffering hardship to apply for increases in ceiling prices.

SODIUM METASILICATE—(WPB) Direction 5 of Priorities Regulation 3 was amended to downgrade AA-1 and AA-2 MRO ratings to AA-2 and AA-3 respectively. Also, sodium metasilicate, which had been free since Order M-355 was revoked, was added to the list.

SYNTHETIC ORGANIC DETERGENTS—(WPB) Allocation procedure was simplified by amendment to Schedule 44 of Order M-300; only producers are required to file for allocation. Two soaps, Syntex M and VEL, were added.

TOTAQUINE—(OPA) Amendment 3 to MPR 278 grants a ceiling of 95 cents an ounce on the majority of sales. The ceiling on sales for civilian use remains at 42 cents.

VITAMIN A—(OPA) Amendment 3 to MPR 203 withdraws open billing authority on low potency oils since no rise in ceiling is contemplated.

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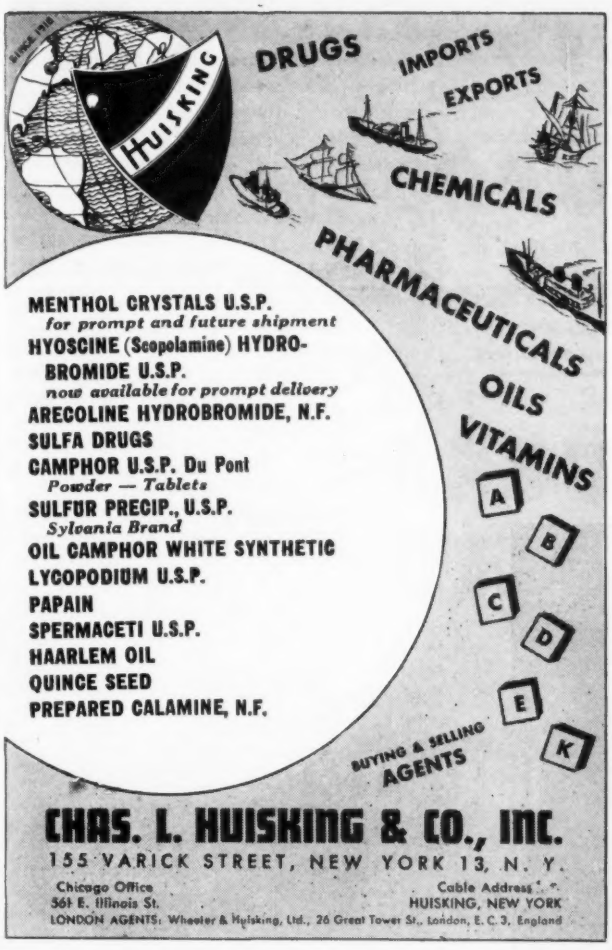
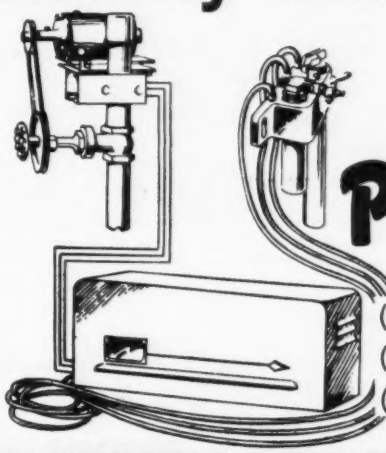


Density Controller for PULPS



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CANADIAN NEWS

by W. A. JORDAN

Monochlorobenzene Now Made in Canada

Canadian Industries, Ltd., sole Canadian producer-for-sale of chlorine, has begun small scale production of monochlorobenzene at its Shawinigan Falls unit as an initial step in the investigation of the feasibility of carrying through commercial operations. At present, the monochlorobenzene is being manufactured in existing equipment, with output earmarked for Canada's new DDT manufacturer, and future plans will be predicated mainly on the development of the domestic DDT market.

Hitherto, monochlorobenzene has not been produced in Canada, and the Dominion's limited demand for this chemical has been met by U. S. suppliers. However, if the economics of Canadian production prove sound it is stated that consideration will be given to the construction of a plant for the manufacture of the monochlor, as well as ortho and paradichlorobenzene, both of which have been brought in from the U. S. in fair tonnages during the past few years.

Naugatuck Making DDT

Naugatuck Chemicals, Ltd., Canadian subsidiary of U. S. Rubber Co., has recently brought into production Canada's first unit for the manufacture of DDT. Most of the output is currently being supplied to the Ontario Department of Lands and Forests for the large-scale spraying of timber stands in an effort to curb the widespread destruction being wrought by the spruce budworm.

Mercury Mines May Reopen

Recent trends in the mercury market, which may presage augmented world demand based largely on the development of new types of mercury-using batteries, may result in the resumption of recovery operations by Consolidated Mining and Smelting Co. of Canada, Ltd., when the labor supply position eases, according to Chairman S. G. Blaylock. As a result of the short supply of labor and of market conditions existing last year, the operations of Consolidated, sole Canadian mercury producer, were discontinued.

Prior to 1940 no mercury was produced in the Dominion, but in that year Consolidated took over the Pinchi Lake, B. C., cinnabar-bearing deposit discovered by the Geological Survey in 1937, and produced 154,000 pounds of the element. Production rose to a peak of 1,690,000 pounds, valued at $4.6 million in 1943, or some fifteen times Canada's average prewar demand.

Therefore, with successful operation of this enterprise dependent primarily on export demand, recovery operations will be resumed only if world needs increase, and prices are maintained above former peacetime levels.

Stanier Awarded Guggenheim Fellowship

Dr. R. Y. Stanier, penicillin production manager of Merck & Co., Ltd., Montreal, has been awarded a Guggenheim fellowship for 1945-46 and will conduct research work on myxobacteria.

New Salt Producer

Standard Chemical Co., Ltd., which six months ago purchased Canada's third ranking salt producer, Goderich Salt Co., Ltd., has recently organized a new wholly-owned subsidiary, Maritime Industries, Ltd., to establish a plant near Amherst, Nova Scotia, for the production of commercial and table grade salt. Plans call for the construction of a unit capable of turning out 120 tons of high grade salt per day as soon as wells can be drilled and equipment obtained.

A large body of good grade salt has been delimited as a result of drilling operations carried out under the direction of the Nova Scotia Department of Mines during the past several years, and extraction will be through bore holes drilled on the property. Company officials expect that a large proportion of the output will be sold to replace salt now imported, and that some export business can be developed.

At present, Canadian production of salt amounts to some 690,000 tons per annum, valued at $4.4 million, of which fifty per cent is consumed directly in the manufacture of caustic soda and other chemicals. Although the mineral is produced commercially in Nova Scotia—by underground mining—and in Ontario, Alberta, and Manitoba, from brine well operations, the Ontario output amounts to 86.5 per cent of the total. Slightly less than 100,000 tons is of table and dairy grades, with 167,000 tons of common fine and 70,000 tons of common coarse constituting the two other major categories.

Imports, from the U. S. A., United Kingdom, and British West Indies, total some 1,400,000 cwt. per annum, with exports shipped mainly to Newfoundland (68,000 cwt.); Jamaica (39,000 cwt.); Trinidad (37,500 cwt.); U. S. A. (18,200 cwt.); New Zealand (7,500 cwt.); British Guiana (6,000 cwt.); and Bermuda (3,600 cwt.), in 1942.

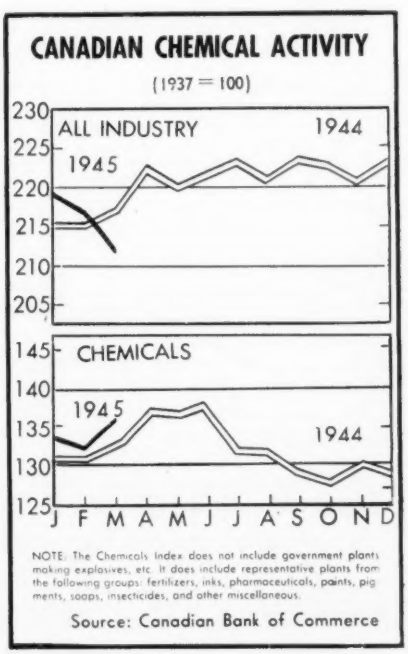
Although it has been rumored for some months that Standard Chemical is considering entering the caustic soda-chlorine field, officials will neither confirm nor deny such reports at present.

Shawinigan To Make Chloral

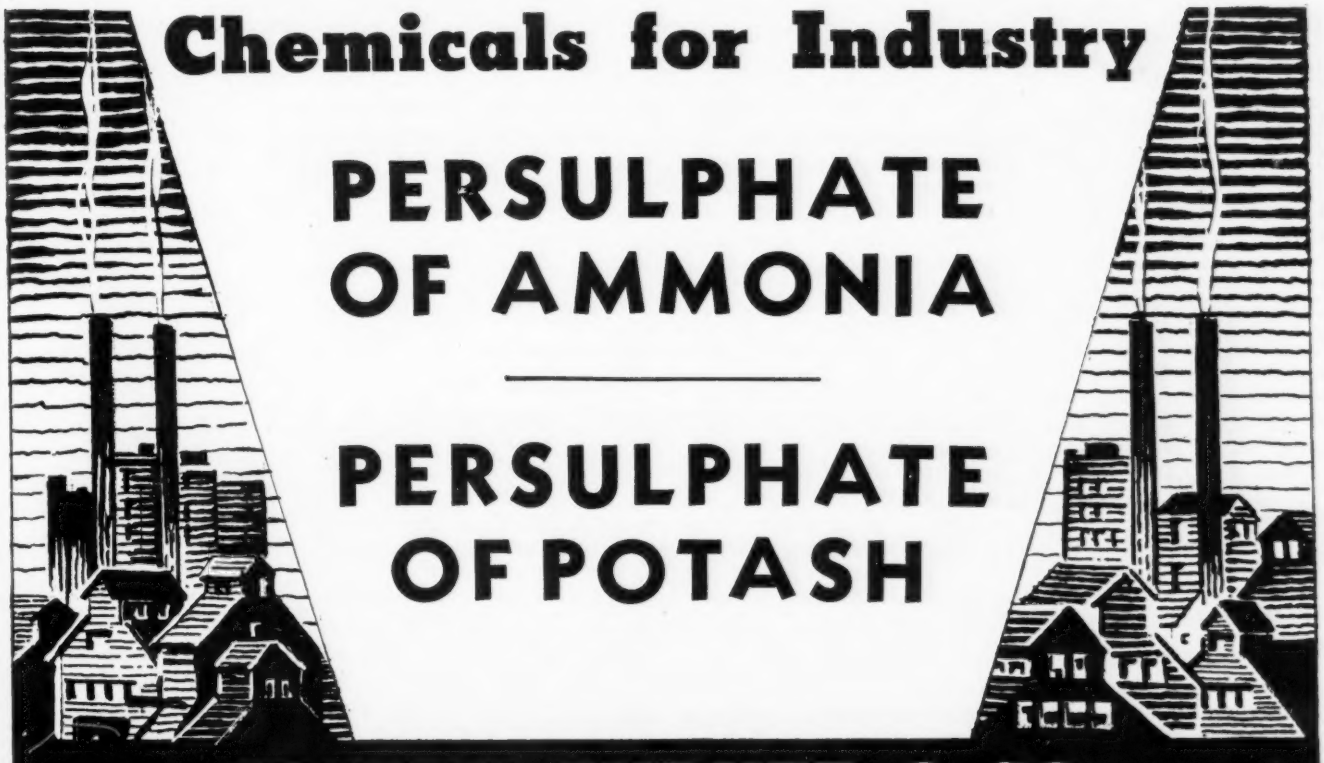
Shawinigan Chemicals Limited will soon start construction of a plant for the production of chloral from acetaldehyde and chlorine.

The plant will be located at Shawinigan Falls, Ont., within the limits of the Company's present property and the original installation will be of sufficient size to supply the immediate Canadian market. Provision is being made for extension to take care of any possible future requirements.

With chloral available from a Canadian source, Canadian producers of DDT should be in a favorable position to compete in domestic and export markets.



Chemicals for Industry



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Personnel News

(*Continued from page 1032*)

Winthrop Announces Promotions

John M. Grece, for the past 15 years manager of the sales promotion department, has been elected assistant secretary of the Winthrop Chemical Company, Inc. Other promotions in the organization include Sidney C. Mills, manager of the Chicago professional service office to regional manager of the mid-West professional service offices, and Arthur W. Jensen to regional manager of the Eastern professional service offices. Reginald C. Bowman has been made manager of the San Francisco professional service office. C. C. Wood is returning to the San Francisco office.

Du Pont Transfers Wolcott to Sabine

H. L. Wolcott, manager of the Morgantown, W. Va., Ordnance Works which the Du Pont Company operates for the government, has been appointed manager of Du Pont's new Sabine River Works being built near Orange, Texas.

At the same time, F. A. Wardenburg, general manager of the Ammonia Department of the Du Pont Company, announced that W. H. Holstein, formerly production superintendent of the Belle, W. Va., Works, will be assistant manager of the Sabine River plant. Construction already has started there on the project to boost production of chemicals for making nylon for military purposes. The job was undertaken at the specific request of the government. The plant, to cost about $20,000,000, is about three miles south of Orange, Texas. Construction will require about 12 months.

Bell to Direct Aluminum and Magnesium

Nigel H. Bell, of New York City, has been named director of the WPB Aluminum and Magnesium Division of the War Production Board, succeeding George C. Heikes. Mr. Heikes has resigned to engage again "in the exploration and development of critical and essential metals in private industry."

Mr. Bell has been with WPB's Aluminum and Magnesium Division since November 1942, and has served recently as chief of the division's Fabrication Branch.

Personnel Notes

HERBERT G. FALES, a vice president of the International Nickel Co., Inc., has been elected as a director of the company, according to an announcement by President Robert C. Stanley. Mr. Fales fills the vacancy left on the board by the recent death of James L. Ashley.

CARL F. GRAESSER has been promoted to the position of assistant sales manager for thermosetting materials at Monsanto Chemical Company's plastics division, Springfield, Mass., assistaing Charles Lichtenberg, assistant general manager of sales of the division.

J. RUSSELL BIRCHER, JR., chemical engineer, has joined the staff of Battelle Institute, Columbus, Ohio, where he will be engaged in research in organic chemistry.

Mr. Bircher served as a senior chemical engineer with the U. S. Army Chemical Warfare Service from 1940 to 1944 and was recently associated with Givaudan-Virginia, Inc., Belle, West Virginia.

JOHAN BJORKSTEN, formerly chemical director of the Quaker Chemical Products Corp., has established an independent industrial research organization at 185 North Wabash Ave., Chicago 1, Ill.

J. T. PHILLIPS has been elected president of the Pacific Chemical & Fertilizer Co., Honolulu, Hawaii, succeeding H. A. Walker who has been named chairman of the board.

DAVID E. ACKER, chemical engineer, has joined the staff of Arthur D. Little, Inc. He was previously associated with the B. B. Chemical Co.

EDWARD M. MELTON has been appointed export sales manager of the Ansco Division of General Aniline & Film Corporation, according to an announcement by George W. Burpee, president.

Mr. Melton was formerly with National Carbon, Inc., as sales representative.

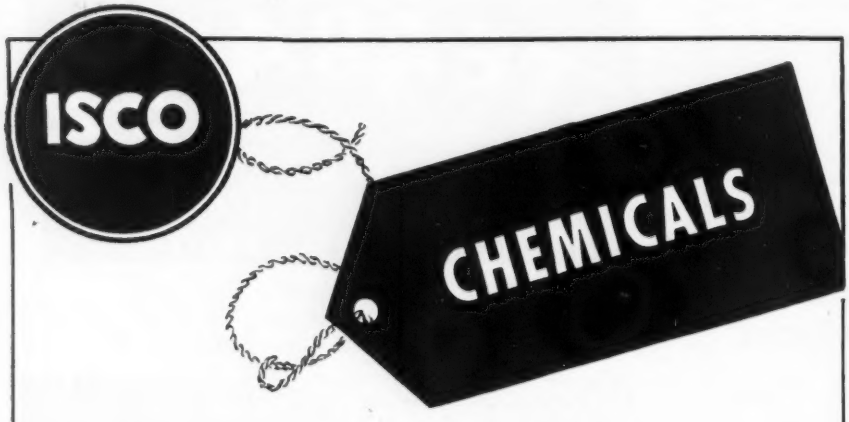
FRANK HAMILTON has been elected by the board of directors to serve as assistant to the president of Nicaro Nickel Co., a subsidiary of Freeport Sulphur Co., according to a recent announcement by Langbourne M. Williams, Jr., president of both companies.

EDWARD C. LEIBIG, production manager of the technical products division, has been promoted to the position as assistant to the director of glass technology for Corning Glass Works. Justin J. Pfeiffer, manager of the Central Falls, R. I., plant, has been advanced to manager of manufacturing in the same division, while D. Kenneth Shaddock, production superintendent of the Central Falls plant, succeeds Mr. Pfeiffer as plant manager.

DR. E. EMMET REID, professor emeritus of chemistry at Johns Hopkins University, Baltimore, has been elected an honorary member of the American Institute of Chemists, in recognition of his contribution to organic chemistry and his outstanding services to the profession.

H. W. LEES, John Hauerwaas, E. G. Gardner, and C. M. Andrada have been elected vice-presidents of the Steel Shipping Container Institute, Inc. New directors are: Mr. Lees, E. A. Tanner, John Neudoerfer, and H. P. Thelen.

(*Turn to page 1057*)



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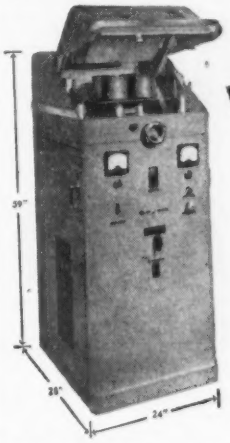

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CHEMICAL ECONOMICS & STATISTICS

Synthetic Rubber Cost

Dr. Edwin R. Gilliland, former assistant rubber director, commented recently that cost considerations would largely determine the outcome of competition between Buna-S and natural rubber. This would be especially true if his prediction is borne out that the quality of the two will, after additional research within the next few years, be essentially the same.

The largest factor in the cost of Buna-S is the cost of butadiene, which is now made from alcohol from agricultural products at a cost of more than 90 cents a gallon. It should be possible, however, to make it from petroleum butylenes at a cost of 6½ to 8 cents a pound.

At this cost, he remarked, it should be possible to produce 400,000 to 500,000 long tons of Buna-S a year to sell at 15 cents a pound and still allow a net profit and an adequate return on investment. He also observed that recent operating results indicated that butyl rubber could be produced and sold at a profit for 15 to 18 cents a pound.

Low-Cost Plasticizer

In connection with Dr. Gilliland's remarks, the recent introduction of a new plasticizer and extender is of significance. Shell Oil Company has announced a petroleum product which costs 2½ cents a pound (maximum of 5 cents in l.c.l. drum lots) which is claimed to improve the quality of Buna-S. It is used in proportions of 10-20 parts per 100 in tire carcass stock and up to 50 parts per 100 in footwear and similar uses. It can readily be seen that its use will lower the over-all cost of the finished product—not merely by acting as a "filler" but by performing a necessary function in the compounding of usable stock.

Nitrogen Compounds in 1944

In the earlier months of 1944 conditions prevailed in the nitrogen industry similar to those in 1943, when lowered ordnance demands and increased supply of anhydrous ammonia furnished increasingly large quantities of ammonia and its compounds to the American farmer. According to the Bureau of Mines, United States Department of the Interior, nitrogen was still urgently needed to meet a shortage in nitrogenous fertilizers in the greatly increased food-production programs. The general complacency which had slackened munitions production in the early part of the year was shattered in mid year with the recognition of the need for more explosives in

Synthetic organic chemicals: United States production, consumption, and stocks

(In pounds, except that creosote oil is expressed in gallons.)

The data given in the following table supplement the figures released beginning March 1, 1944, in the Facts for Industry Series 6-2-1 to 6-2-14. Information concerning the limitations of the data, the completeness of coverage, and the selection of items were given in the Series 6-2-1 report.

In the table, production (except as noted in footnote 10) includes material produced whether consumed in the producing plants or sold. Consumption represents consumption at producing plants only; it includes material produced in such plants, or material purchased or transferred from other plants. Stocks are company stocks, as of the last day of the year or month, located at plant, in transit, or in warehouse, and include purchased as well as produced material.

Item	*February 1945*		
	Production	*Consumption*	*Stocks*
Acetanilide (technical and U.S.P.)	490,965	113,101	345,319
Acetic acid (synthetic)[1]	21,914,210	19,448,168	8,322,696
Acetic acid (natural, including that from calcium acetate)[2]	2,793,514	[4]	1,738,512
Acetic anhydride[3]	Published quarterly		
Acetylsalicylic acid (Aspirin)	816,202	[4]	980,175
n-Butyl acetate	4,928,093	140,658	3,325,700
Creosote oil, tar distillers[5]	10,459,296	[4]	10,500,670
Creosote oil, byproduct[6]	3,055,632	16,643	894,588
Cresols, meta-para[7]	492,204	[4]	265,319
Cresols, ortho-meta-para[7]	797,924	.....	[4]
Cresylic acid, crude	1,966,898	[4]	1,113,439
Cresylic acid, refined[7]	2,734,615	[4]	1,512,182
Diethyl ether (all grades)	7,109,254	[4]	3,687,452
Ethyl acetate (85 percent)	9,145,083	1,014,589	7,033,794
Lactic acid (edible)	428,061	[4]	[4]
Lactic acid (technical)	409,890	13,902	247,813
Methyl chloride (all grades)	2,267,759	[4]	581,066
Naphthalene, less than 79° C. (coke-oven operators)[8]	6,886,125	.....	2,682,260
Naphthalene, less than 79° C. (tar distillers)[9]	[10]15,825,833	[4]	7,609,091
Naphthalene, refined (79° C. and over)	5,355,560	4,517,978	1,767,348
Oxalic acid (technical)	1,639,108	[4]	415,542
Phenobarbital and sodium salts	19,806	[4]	32,568
Phthalic anhydride	9,530,915	3,188,766	1,655,112
Riboflavin (for human use)	[4]	[4]	27,987
Sulfa drugs (total)	428,951	[4]	645,345

[1] Excludes statistics on recovered acetic acid, which are confidential.

[2] Natural acetic acid (produced by direct process from wood) and acetic acid distilled from calcium acetate. These statistics are collected and compiled by the U. S. Bureau of the Census.

[3] Represents all acetic anhydride, including that produced from acetic acid by the vaporphase process.

[4] Confidential; publication would disclose operations of individual companies.

[5] Product of distillers who use purchased coal tar only.

[6] Product of byproduct coke-oven operators only. These statistics are collected and compiled by the Coal Economics Division, U. S. Bureau of Mines.

[7] Statistics represent total production, consumption, and stocks, including both data reported by coke-oven operators to the Coal Economics Division, Bureau of Mines, and data reported by distillers of purchased coal tar to the U. S. Tariff Commission. Data reported to the two agencies are combined to prevent the disclosure of the operations of individual companise.

[8] Includes only the production, consumption and stocks of coke-oven operators. Statistics combine the three grades (solidifying at less than 74° C., at 74° C. to less than 76° C., and at 76° C. to less than 79° C.) in order to prevent the disclosure of the operations of individual companies. These statistics are collected and compiled by the Coal Economics Division, Bureau of Mines.

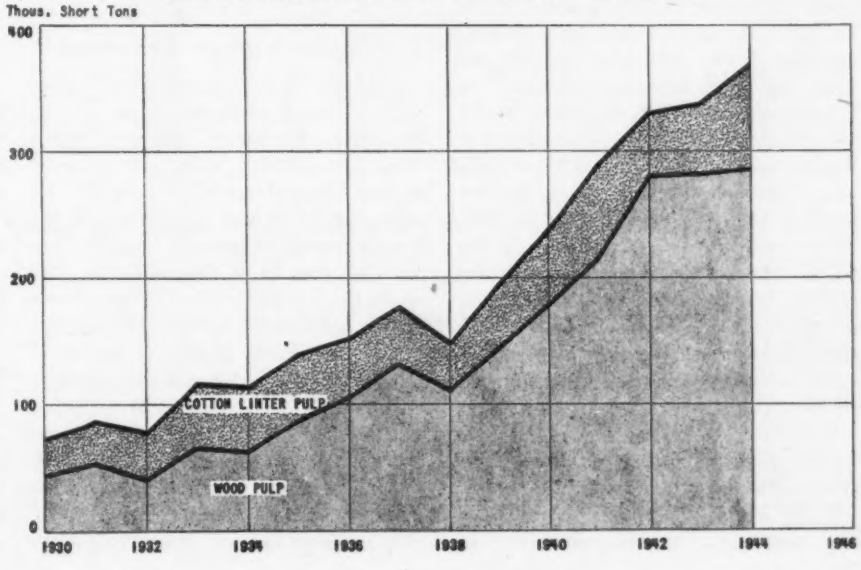
[9] Includes only the production, consumption and stocks of distillers of purchased coal tar. Statistics combine the grades specified in footnote 8, in order to prevent the disclosure of the operations of individual companies.

[10] For the grade solidifying at less than 74° C., these statistics represent production for sale only; for the other two grades, they represent production both for consumption within the producing plant and for sale. Production for consumption of the grade solidifying at less than 74° C. is excluded in order to minimize duplication as this grade is frequently converted to grades of higher melting point.

[11] Includes acetylsulfathiazole produced both as a sulfa drug and as an intermediate, resulting in an appreciable duplication which in unavoidable.

Source: Statistics collected and compiled by the U. S. Tariff Commission, except where otherwise noted.

CELLULOSE CONSUMPTION BY U. S. RAYON INDUSTRY 1930 TO 1944



the coming military campaigns. A sharp reversal of munitions production policy followed, and nitrogen deliveries to the fertilizer industry were slashed as early as August, 1944.

From mid summer on, increasing military demands reduced nitrogen supplies for 1944-45 crops, and at the end of the year it was believed that the quantity of nitrogen available to agriculture would be less than was used in the previous year. In June, 1944, it had been anticipated that at least 675,000 tons of nitrogen would be obtainable for fertilizers, or about 7 percent more than the 630,000 tons used in 1943-44. In September estimates placed the possible supply at only 530,000 tons but in November expectations had risen slightly to 576,000 tons. The annual nitrogen capacity of the United States at the present time is about 1,450,000 tons of which 750,000 tons is of Government plants and 700,000 tons of plants belonging to private owners. This large capacity, developed under inflated wartime conditions, is far in excess of normal peacetime demands, and the question of its post war utilization is still under consideration. It appears possible that at least some of the excess Government capacity could be used in the post war period and that some of the balance should be kept in standby condition as an integral part of our military establishment.

Superphosphate: Production, Receipts, Disposition and Stocks, by Type, March 1945

In short tons (2000 pounds)

Item	Normal 18% APA	Concentrated 45% APA	Wet-base goods 18% APA
March, 1945			
Stocks on hand, beginning of month	866,945	22,117	12,244
Production	587,467	20,861	3,176
Received from other acidulators (inc. exchange transfers)	16,562	....	....
Book adjustments (account of inventory)	+3,153		
Total supply	1,474,127	42,978	15,420
Disposition, total	661,891	24,237	9,040
Shipments, total	364,330	24,080	4,156
Used in reporting plants	297,561	157	4,884
Stocks on hand, end of month	812,236	18,741	6,380
February, 1945 [1]			
Stocks on hand, beginning of month	861,087	24,820	13,294
Production	587,740	18,560	3,869
Received from other acidulators (inc. exchange transfers)	13,482	....	....
Book adjustments (account of inventory)	+111	....	....
Total supply	1,462,420	43,380	17,163
Disposition, total	595,475	21,263	4,919
Shipments, total	339,478	20,927	4,495
Used in reporting plants	255,997	336	424
Stocks on hand, end of month	866,945	22,117	12,244
March, 1944			
Stocks on hand, beginning of month	816,574	50,560	11,440
Production	593,916	25,552	6,742
Received from other acidulators (inc. exchange transfers)	18,291	....	....
Book adjustments (account of inventory)	−3,036		
Total supply	1,425,745	76,112	18,182
Disposition, total	701,164	24,703	10,680
Shipments, total	400,450	24,497	8,768
Used in reporting plants	300,714	206	1,912
Stocks on hand, end of month	724,581	51,409	7,502

NOTE: March 1945 statistics are based on the reports of 161 plants, of which 158 manufacture normal superphosphate, eight manufacture concentrated superphosphate and seven manufacture wet-base goods. Three plants produce concentrated superphosphate exclusively, while 158 plants produce normal material only, or normal and concentrated or normal and wet-base goods.

These statistics include data for all plants, including government owned, known to have facilities for superphosphate manufacture. All quantities are expressed in equivalent short tons of the indicated A. P. A. (available phosphoric acid) percentage content. The statistics pertain only to superphosphate in dry-base or dry-mixed goods. Figures for receipts of material, shipments, consumption and stocks relate only to plants which actually produce superphosphate. Cases in which book figures differ from actual physical inventory are covered under the heading "Book Adjustments," the amount of book excess being indicated by a minus sign (−) and the amount of book deficit by a plus sign (+). The use of this device makes possible a full accounting of all quantities of each type of superphosphate.

[1] Revised.

Inorganic Nitrogen Compounds

Domestic Nitrate Deposits.—There has been no recent development of or output from any of the domestic deposits of natural nitrates so far as is known. Deposits of soluble nitrate minerals are widely distributed throughout the United States, but the known deposits are all too small and low grade to serve as a basis for a domestic nitrate industry.

Chilean nitrate.—Large quantities of natural sodium nitrate and much smaller quantities of potassium-sodium nitrate continue to be imported from Chile under a wartime subsidy whereby the United States Government absorbs some of the increased costs. The shortage of ships resulting from world-wide military and naval operations has been a bottleneck in the movement of Chilean nitrate to the United States. The War Shipping Administration has indicated that the shipping situation will continue to be uncertain. However, according to the War Production Board, it established in October, 1944, an A-3 shipping priority for 850,000 tons of 16-percent Chile nitrate of soda for the year ending June 30, 1945, considerably more than the reported 597,000 tons brought in during 1943-44 fertilizer year.

Losses of nitrate by enemy action in World War II during movement here from Chile have been small.

In the first World War Chilean nitrate was used largely in the manufacture of munitions, but in World War II the great bulk of the imports into the United States has been for the production of food and feed.

Imported sodium nitrate is under allocation, first under Order M-62 dated February 1, 1942, which was revoked December 26, 1944, when sodium nitrate was placed under Schedule 80 (Nitrogen Compounds) of General Allocation Order M-300 of the War Production Board. Imports of Chilean nitrate have been inadequate for full agricultural requirements. Consequently little has been alloted to mixed fertilizers in recent years. Its use in eastern United States has been restricted to direct application to the soil as side and top dressings.

Synthetic Nitrogen Compounds

General.—Ammonia and certain nitrogen compounds were under allocation by the War Production Board; General Preference Orders M-163, covering byproduct ammonia; M-164, synthetic ammonia; M-62, sodium nitrate; and M-165, the remainder. All were in force throughout 1943 and up to December 26, 1944, when they were revoked. These compounds were then placed under General Allocation Order M-300, Schedules 79 (Synthetic Ammonia) and 80 (Nitrogen Compounds), as Appendix B materials. The nitrogen compounds listed under Schedule 80 of December 26, 1944, were ammonium sulfate, sodium nitrate, ammonium nitrate (fertilizer grade), calcium cyanamide, ammonium phosphate (fertilizer grade), ammonium nitrate mixtures, mixed nitrogen solutions, B liquors, urea mixtures of 42-percent nitrogen (including "Uramon" but not including food grade urea).

On February 7, 1945, Schedule 80 was amended so as to substitute aqua ammonia (A, B, and C liquors) for B liquor.

Ammonia and its compounds.—The principal uses of ammonia have been military and agricultural. Minor quantities are used in industry. The surplus of ammonia above military demands which appeared in 1943, continued into the first part of 1944, and agriculture benefited, but in the latter part of the year increased munitions requirements reduced the supply to agriculture.

Domestic capacity for the production of synthetic ammonia has been greatly increased during the war and is now apparently much greater than probable postwar demands. Current production figures are not available.

Production of domestic byproduct-coke ammonia liquor (NH_3 content) in 1944 (1944 ammonia liquor and ammonium sulfate figures are preliminary) was 31,665 tons compared with 34,106 tons in 1943. Sales were 29,965 tons in 1944 as against 32,327 tons in 1943.

Ammonium sulfate, one of the principal sources of nitrogen in mixed fertilizers, is obtained solely as a manufactured product. Virtually all is used for fertilizer. Except for small quantities of synthetic origin, the entire produc-

tion in the United States comes from by-product-coke operations. The byproduct-coke output increased from 761,270 short tons in 1943 to 814,756 tons in 1944, whereas sales in 1944 were 776,828 tons compared with 774,815 tons in 1943. Stocks increased from 28,397 tons on January 1 to 69,013 tons at the end of the year.

Ammonium nitrate was produced in both Government and private plants in 1944, and considerable quantities were imported from Canada. Production figures are not available. According to the United States Department of Agriculture, consumption in the 1943-44 fertilizer season for fertilizers was approximately 300,000 tons. Curtailment of the supply for fertilizer purposes from Government nitrogen plants began in the summer of 1944, but deliveries from the Tennessee Valley Authority plant and from Canada continued. Munitions requirements were expected to preclude conversion of ammonia to ammonium nitrate for fertilizer by the Ordnance plants after November or December, leaving the Canadian plants as the principal source of supply during the remainder of the 1944-45 fertilizer year.

On February 1, 1944, distribution of ammonium nitrate being produced by the Army ordnance plants for use in the manufacture of fertilizer was placed in the hands of the Commodity Credit Corporation under an arrangement agreed upon by the War Production Board and the War Food Administration. The Commodity Credit Corporation in turn designated Associated Cooperatives, Inc., as its agent in the distribution of this material. This arrangement supersedes that in effect since November 1, 1943, under which TVA acted as distributor. According to report, a private company acts as distributor for the Canadian product.

The reduction in military needs freed large amounts of TVA production for commercial distribution as fertilizer and also presented an opportunity for use of nitrogen fertilizers in test-demonstrations in the program of TVA and land grant colleges, according to the annual report of the TVA for the year ended June 30, 1944.

Sodium nitrate.—Little information is available regarding the current production or utilization of domestically produced synthetic sodium nitrate. According to the War Production Board the production in the spring of 1944 was running at a rate of about 310,000 tons a year, but it is believed that the 1944 actual production was much in excess of that figure.

Organic Materials

Because of restrictions in the use of chemical nitrogen in 1942 an increased demand for organic nitrogen-bearing fertilizers arose late in the year. To secure equitable distribution, the War Food Administration, on May 7, 1943, issued Food Production Order 12, effective May 1, 1943, banning purchase of these materials by fertilizer manufacturers without prior approval of the director of food production. On June 7, 1943, a revised food production order, War Food Order No. 12, effective June 1, 1943, to July 1, 1944, was issued. This order limited the quantity of all such materials that could be used as fertilizer to 70 percent of the amount (in terms of nitrogen) acquired and used in the base period July 1, 1941, to June 30, 1942. Subsequently this percentage was raised to 80. On July 1, 1944, the War Food Administration revoked the broad general War Food Order No. 12 and issued in its place a restricted order, W.F.O.-105, covering only edible oilseed meals or cake. Restrictions are retained on edible oil seed meals available for fertilizer because of heavy requirement for them for livestock feed. The new order also contained provisions governing the distribution for fertilizer use of edible type oilseed meals which are of inedible quality.

Calcium cyanamide, CaCN, is not produced in the United States but is manufactured at Niagara Falls, Ontario, Canada, by North American Cyanamid, Ltd., at the only cyanamide producing plant in the British Empire or in the Western Hemisphere. It is marketed under the trade name Cyanamid. Considerable quantities are imported into the United States each year. Formerly used almost entirely as a fertilizer it has been supplanted to some extent by the introduction of direct methods of ammonia synthesis. However, its importance as a chemical raw material has increased.

Industrial Explosives

Apparent consumption of industrial explosives in the United States during 1944 was slightly lower than in 1943, according to the Bureau of Mines, United States Department of the Interior. The over-all decline of 3 percent resulted from decreased use of black granular powder and "high explosives other than permissible" which was offset only in part by gains in consumption of black pellet powder and "permissible" high explosives. A total of 464,111,323 pounds was produced and sold in 1944. This comprised 42,959,775 pounds of black blasting powder (granular and pellet), 102,538,247 pounds of permissible explosives, and 318,613,301 pounds of high explosives other than permissibles. The bulk of the black blasting powder was consumed by the coal-mining industry, which required 93 percent of the entire production. The coal-mining industry was also the largest user of permissible explosives, consuming over 99 percent of the reported sales. High explosives other than permissibles were more widely used; the coal-mining industry consumed 24 percent; metal-mining, 32 percent; quarrying and nonmetal-mining, 22 percent; railway and other construction work, 19 percent; and all other purposes, 3 percent.

The coal-mining industry alone required 47 percent of all explosives produced and sold in the United States in 1944 compared with 40 percent in 1943. Anthracite mines in Pennsylvania consumed 10 percent and bituminous-coal mines, 37 percent of the total 1944 production. Of the 219,279,003 pounds used in 1944 to produce coal, 101,824,872 pounds, or 47 percent, were the permissible type; 77,493,356 pounds, or 35 percent, were high explosives other than permissible; and 39,960,775 pounds, or 18 percent, were black blasting powder. The use of black blasting powder in coal mines continued to decrease, falling to 18 percent from the 23 percent of all explosives used in coal mines in 1943. The proportion of high explosives other than permissibles increased from 28 percent in 1943 to 35 percent in 1944, whereas the proportion of permissibles used in coal mines declined slightly from 49 percent to 47 percent.

Pyroxylin Coating

During the month of January, 1945, the pyroxylin coating industry spread 4,661,485 pounds of pyroxylin according to reports received from the 21 establishments which are believed to include the entire industry.

At the suggestion of industry members, several changes have been made in the method of collecting production and shipments data which should result in more comprehensive and accurate statistics relating to this industry. These changes are reflected in the January, 1945, report.

In this report the quantity of pyroxylin spread is shown on two bases; the quantity representing the spread of an 8-pound

Salient Statistics of Industrial Explosives in the United States, 1935-39 Average, 1943 and 1944

Kind of explosive		*1935-39 average*	*1943*	*1944*
Apparent consumption of—				
Black blasting powder:				
Granular	25-lb. kegs	1,250,831	792,565	651,299
	pounds	31,270,775	19,814,125	16,282,475
Pellet	25-lb. cases	1,363,237	1,064,316	1,067,092
	pounds	34,080,925	26,607,900	26,677,300
Total	25-lb. units	2,614,068	1,856,881	1,718,391
	pounds	65,351,700	46,422,025	42,959,775
High explosives:				
Permissible	pounds	45,683,634	92,655,519	102,538,247
Other than permissible	pounds	253,624,298	338,573,441	318,613,301
Total	pounds	299,307,932	431,228,960	421,151,548
Grand total	pounds	364,659,632	477,650,985	464,111,323

jelly (containing 1 pound of gun cotton and 7 pounds of solvent) as shown in previous reports, and the actual quantity spread which will be used in future reports. Pending the development of a suitable factor for converting the previous 8-pound figures to their actual equivalents both will be shown.

In order to facilitate comparison between spreading capacity and quantity of pryoxylin actually spread, the capacity figures are now reported in pounds instead of yards as formerly. The monthly capacity is now based on the maximum 600 hours per month in lieu of 350 hours formerly used.

	1945 January	1944 December	1944 January	1943 January
Pyroxylin Spread				
Actually spread, pounds	4,763,537	.....	.....	.....
Spread (based on 8 pound jelly) pounds[1]	4,661,485	4,126,369	4,716,415	3,790,363
Monthly Capacity				
Pounds[2]	14,746,051	.....	.....	.....
Yards[3]	.....	8,240,156	8,052,956	7,692,956

[1] Based on one pound of gun cotton to 7 pounds of solvent making an 8 pound jelly.
[2] Based on all machines suitable for pyroxylin coating, assuming 600 working hours per month and entire production on 53"—1.32 sateen coated to a finished weight of 17½ ounces per linear yard assuming 40 per cent solids. No comparative data available for 1943 or 1944.
[3] Based on maximum quantity of 1.27 to 1.30 yard sateen coated to a finished weight of 17½ ounces per linear yard in a month of 350 working hours. No comparable data for January 1945.

Bauxite in Arkansas

Several million tons of bauxite have been marked out by Bureau of Mines engineers during the past three years in an area of about 1,400 square miles in the central Arkansas bauxite belt.

The plotting of these additional reserves of bauxite followed extensive geophysicial surveys started by the Bureau early in 1942. With sensitive geophysical instruments, the Bureau "explored" underground formations to weed out unfavorable areas and furnish a blueprint for the drilling program that followed.

On the basis of the geophysical exploration, a total of 1,300,245 feet of holes—more than 246 miles—were drilled by other Bureau crews or contractors in subsequent months, and an estimated 9,307,000 tons of bauxite of a grade suitable for direct use by industry for metals, abrasives and chemicals were blocked out in Saline and Pulaski Counties. This is equivalent to a 12-year supply of commercial bauxite at the normal peacetime rate of consumption in the United States.

An additional 3,825,000 tons of marginal ore described as usable for metal or chemical purposes were charted, together with several million tons of high-alumina and bauxitic clays that must await further metallurgical developments before it can be used commercially.

A breakdown reveals that since May 1, 1942, the drilling program has blocked out 28,621,000 tons of bauxite and bauxitic clays in Arkansas, and this figure includes the 9,307,000 tons of commercial grade bauxite. Another 29,621,000 tons of bauxite and bauxitic clays are estimated to be present but this has not been completely delineated and proved. In addition, the Bureau crews charted 17,917,000 tons of high-alumina clay, and they place the indicated and inferred clays at about 73,000,000 tons.

As the supply of native high-grade bauxite in the United States is limited and the war has made heavy drains on resources, the Bureau of Mines is building a 50-ton-a-day pilot ore-dressing mill at Bauxite, Ark., to test the commercial feasibility of a Bureau process for concentrating low-grade bauxite for use in existing Bayer Alumina plants. It is expected to go into operation this summer.

Monthly Paper Production in the United States, by Type, January-December 1944 and 1943 Monthly Average
(Tons of 2,000 pounds)

Type of Paper	1943 Monthly Average	1944 January	February	March	April	May	June	July	August	September	October	November	December	Total
All types	[1]1,419,641	1,411,268	1,379,638	1,482,644	1,402,383	1,484,667	1,460,305	1,326,206	1,518,922	1,421,869	1,501,175	1,464,762	1,328,965	17,182,804
Paper, total	701,271	687,134	668,657	719,962	657,571	703,610	690,840	621,394	720,152	679,898	715,596	699,872	655,550	8,220,236
Newsprint	67,609	60,101	54,118	60,552	56,630	61,018	61,109	59,600	60,571	61,408	61,741	62,758	61,146	720,752
Groundwood paper	48,806	48,840	47,861	49,725	50,451	51,705	47,198	42,464	53,948	50,147	50,946	51,390	48,419	593,094
Printing	19,794	20,092	18,463	19,914	19,978	21,208	19,409	15,489	19,207	19,424	20,122	18,475	19,478	231,259
Specialties	29,012	28,748	29,398	29,811	30,473	30,497	27,789	26,975	34,741	30,723	30,824	32,915	28,941	361,835
Book paper	132,740	122,772	121,755	125,633	117,154	124,275	120,900	103,567	125,130	117,076	122,123	120,883	114,517	1,435,785
General printing	95,810	88,195	84,384	90,270	82,001	88,361	85,998	74,639	89,122	86,917	89,694	89,201	85,432	1,034,214
Converting paper	36,383	34,508	37,050	35,206	35,066	35,697	34,730	28,762	35,892	30,082	32,284	31,629	28,966	399,872
Other book paper	547	69	321	157	87	217	172	166	116	77	145	53	119	1,699
Fine paper	85,050	78,323	76,612	87,975	78,017	82,834	79,709	69,941	85,959	81,931	87,432	85,970	79,669	974,372
Writing paper[2]	63,942	57,137	57,152	64,991	56,819	61,124	60,665	52,011	64,084	61,994	65,724	64,323	60,533	726,557
Cover and text	3,978	4,780	4,194	5,076	4,702	4,610	3,365	4,823	4,501	3,187	5,109	4,732	3,286	52,365
Reproduction	3,909	4,017	4,186	4,547	4,039	4,522	4,284	2,825	4,031	4,008	4,493	4,610	4,318	49,880
Bristols[3]	8,260	7,721	5,953	7,833	7,512	7,414	6,332	5,318	8,091	7,137	6,835	7,178	6,623	83,947
Thin paper	4,529	4,475	4,753	5,083	4,799	4,991	4,958	4,818	5,138	5,168	4,828	4,747	4,573	58,329
Other fine paper	432	195	374	445	146	173	105	146	114	437	443	380	336	3,294
Coarse wrapping, converting and bag paper	162,242	166,487	159,830	170,738	145,821	158,549	162,972	147,131	170,420	157,413	170,941	163,716	148,311	1,922,329
Wrapping paper	69,313	65,081	62,211	70,715	57,410	63,235	66,904	61,291	70,772	66,427	72,900	70,775	61,363	789,084
Glassine	6,971	7,289	7,051	7,406	7,069	6,953	6,836	6,164	6,834	6,903	6,954	7,104	6,150	82,713
Greaseproof	2,282	2,022	1,894	2,275	2,066	1,954	2,526	1,715	2,006	2,088	1,845	1,991	2,024	24,406
Vegetable parchment	2,774	2,730	2,638	3,059	2,460	2,844	2,669	2,245	2,846	2,932	2,438	2,532	2,854	32,247
Other wrapping paper	[4]57,286	53,040	50,628	57,975	45,815	51,484	54,873	51,167	59,086	54,504	61,663	59,148	50,335	649,718
Bag paper	43,176	39,902	35,248	32,144	25,805	29,133	31,054	28,583	31,246	29,418	33,542	31,312	27,780	375,167
Converting paper	[4]49,753	61,504	62,371	67,879	62,606	66,181	65,014	57,257	68,402	61,568	64,499	61,629	59,168	758,078
Multi-wall sack paper	26,289	30,054	29,745	31,709	30,727	36,007	33,267	31,885	36,971	33,298	33,079	34,061	30,899	391,702
Special industrial paper	17,305	[4]18,999	[4]19,267	[4]20,309	[4]19,287	[4]22,291	[4]22,730	[4]18,794	[4]21,087	[4]20,267	[4]22,233	[4]20,230	[4]19,922	[4]245,416
Sanitary paper	67,169	67'682	64,902	70,278	66,014	69,942	69,075	62,196	67,556	64,770	71,960	68,004	65,514	807,893
Tissue paper	13,564	13,739	12,906	14,519	12,953	13,305	12,558	12,520	13,898	12,672	13,390	13,357	11,721	157,540
Absorbent paper	7,354	7,618	7,243	8,842	7,393	7,955	7,323	6,728	7,908	7,673	6,981	7,106	7,337	90,107
Building paper	73,132	72,519	74,416	79,682	73,124	75,729	73,999	66,568	76,704	73,243	74,770	72,397	68,095	881,246
Paperboard, total	718,370	724,134	710,981	762,682	744,812	781,057	769,465	704,812	798,770	741,971	785,579	764,890	673,415	8,962,568
Container board	340,665	340,343	330,301	347,660	348,252	374,304	369,643	344,759	381,913	351,861	372,309	358,143	308,796	4,228,304
Folding boxboard	170,603	161,986	165,148	183,452	171,133	184,350	180,105	158,313	189,955	174,230	189,769	190,106	167,605	2,116,152
Set-up boxboard	69,092	61,353	56,774	64,760	62,613	67,825	67,631	57,594	65,619	62,661	64,387	63,345	55,751	750,313
Cardboard	5,313	4,849	6,102	6,182	5,219	6,063	5,987	4,912	6,781	5,373	5,944	6,224	6,073	69,709
Building board	88,654	92,315	88,397	94,483	96,770	88,555	88,938	86,734	95,170	89,932	93,318	92,733	80,122	1,087,467
Miscellaneous board	44,043	63,288	64,259	66,145	60,825	59,960	57,161	52,500	59,332	57,894	59,852	54,339	55,068	710 623
Tube stock	25,609	42,040	43,284	43,562	39,452	37,882	35,383	32,853	38,038	37,730	38,721	34,943	34,219	458,107

[1] Includes a small amount of paper not classified by type.
[2] Includes Drawing, mechanical and detail and Protective and check.
[3] Includes Government postal card stock.
[4] Includes a small quantity of special industrial paper having a base weight of less than 100 pounds. Such paper was classified as Wrapping paper prior to January 1944.

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MARKET OUTLOOK

Demand Will Continue In Spite of V-E Day

Postwar Prospects Good

Chile Worried About Our Nitrogen Capacity

Livestock Needs Sulfa Drugs Too

No Ceiling Increase For Gum Rosin Producers

Natural Rubber Will Come Back

Review of Recent Markets

●

V-E Day's Impact on Chemicals

Surrender of Germany led chemical executives to appraise the supply and demand situation at present and in the immediate future. The feeling seemed to be general that demand will continue at high levels, although supplies will ease somewhat throughout the third and fourth quarters of the year as manpower becomes increasingly available.

Many of the shortages—this is true of sulfuric acid, for example—are due more to a lack of transportation facilities than to an actual scarcity of materials.

Continued high demands of the Far-Eastern war for synthetic rubber, aviation gasoline, and other petroleum products will prevent amelioration of the prevailing acute situation in alkalies. Even after the war, increased civilian demands will sustain heavy requisitions for five or six years.

The pent-up need for civilian tires, both for private cars and for commercial transportation, coupled with the vehicular requirements of the Pacific war, will allow no reduction in carbon black output, which is now over one billion pounds per month. It is probable that not all the presently planned expansion will be built.

There is no reason, as yet, to expect a diminution of petroleum products production. The increasing tempo of the Pacific war will take up the slack of gasoline and oil consumption in Europe.

Alcohol production after V-E Day depends a great deal on the disposition of Government operation on the private of our grain resources. If petroleum butylenes can be diverted from aviation fuel to butadiene production, alcohol now needed for butadiene can be diverted to other uses. If large quantities of American grain must be shipped to Europe, stocks remaining in this country would be required more for foodstuffs than for alcohol production. The picture is not yet clear as to the future of alcohol production.

Postwar Prospects

A high rate of chemical production will be maintained as long as the war with Japan continues—but what of peace?

While production will certainly decrease in specific types of materials—explosives, for instance—no decrease is anticipated in the large chemicals-consuming industries such as paper, glass, petroleum, and the like.

The attitude of Lammot du Pont, president of the du Pont Company, is typical of leaders in the industry. He remarked that his company expects an increase in volume sales after the war.

The plastics industry is one example of what might be expected. Since 1939 plastics and resins production has increased 325 per cent. Wartime necessity has uncovered many hitherto untried applications of plastic materials, and in many cases they have been found superior to the materials they displaced. Many of these wartime applications will find a market in civilian goods, and it is likely that plastics production will not diminish from the level of 1940-45.

Chilean Nitrate

Importers of Chilean nitrate are deeply concerned about the disposition of Government-owned ammonia plants. J. A. Woods, president of the Chilean Nitrate Sales Corporation, expressed the attitude of the industry in his report on operations for 1944-45, where he said that the Chilean nitrate industry is prepared to maintain its position in the American market against all competitors—unless one of the competitors is the United States Government or one of its agencies. He also expressed the opinion that importation of nitrate from Chile is necessary in order to create a Chilean market for American goods. While Chile admits the fairness of private competition, it would look upon Government-subsidized production as a blow to the Good Neighbor Policy.

He was also concerned about the effect American producer. "If the Government operates these plants in peacetime, the free enterprises of America can be very quickly put out of business."

Veterinary Market For Pharmaceuticals

The gradual reduction of price in sulfa drugs and penicillin is creating a market for these chemotherapeutic agents in veterinary practice.

Both of the above-named drugs have been found effective in the treatment of animal diseases, such as dysentery, enteritis, colds, pneumonia, distemper, bovine mastitis, and others.

While penicillin has been found to be effective against animal diseases, it is likely that sulfa drugs will be used more widely unless the former becomes cheaper and easier to administer than at present. A reasonable estimate of the veterinary market for sulfa drugs is 1,000,000 pounds a year, with more optimistic guesses running as high as 2,000,000 a year.

No Ceiling Increase For Gum Rosin

No immediate relief of the gum rosin shortage is in sight, in view of OPA's denial of a request for an increase in the ceiling price. Turpentine producers claim that an increase is necessary in order that wages can be made high enough to keep workers, but Chester Bowles disagreed, saying, "OPA cannot find that an increase in ceiling price is necessary either to relieve hardship, or to maintain or increase production.

Following the denial, the War Food Administration filed an appeal with the Office of Economic Stabilization. The War Production Board, too, is said to be increasingly concerned over the difficulty which consumers are experiencing in securing the rosin for essential needs.

Natural Rubber

A larger comeback to natural rubber after the war than was anticipated is hinted at by some of the large rubber manufacturers. Natural rubber is necessary, it is claimed, to make the best quality heavy-duty truck tires. While no one in the industry cared to say that natural would supplant synthetic to any large extent, it seems clear that the industry is looking forward to a substantial return to natural rubber. One of the leaders said, "V-E Day brings closer the time when it will be possible to obtain usable supplies of natural rubber from Far-Eastern areas, and that will in itself be a turning point in the actual operations of the rubber industry."

To supplement our fast dwindling reserves of natural rubber, John L. Collyer, rubber director, announced that all the guayule crop in the continental United States will be harvested and processed

within the next two years. This action is expected to yield 12,000 long tons of natural rubber for blending with GR-S. The natural rubber stockpile is expected to fall to 55,000 tons by the end of this year. Cultivation of guayule was undertaken in 1942 as the Emergency Rubber Project, authorized by Congress.

Of significance to postwar markets is the fact that the Poage Bill, to make the cultivation of guayule a postwar agricultural project in the Southwest, passed the House and is awaiting action by the Senate.

Market Review

Heavy Chemicals. The end of the European war will restore France to the role of a major potash producer. It is estimated that Alsatian deposits run as high as 300,000,000 tons of practically pure potash. Alkalies are still in a very tight position; this is largely due to increased production of synthetic rubber, petroleum products, and silica gel. The unavailability of chlorine has caused an increased use of bleaching power. Sal ammoniac and trisodium phosphate have virtually disappeared from the open market. Potassium permanganate production has been increased, but since the demand has also increased, the supply situation is not expected to improve. Heavy withdrawals of nitrogen chemicals for military purposes have caused an acute scarcity of ammonium sulfate. Bichromates are scarce in general, and this is particularly true of sodium bichromate. Increased production of the latter is planned at the Defense Plant Corporation magnesium plant at Lake Charles, La. WPB has approved, and production will start early in January.

Fine chemicals. Brazil will produce 500,000 tons of menthol this year compared to 250 tons last year. In this country, producers of fine chemicals are concerned over the difficulty of obtaining export licenses, the denial of which may adversely affect our export trade long into the future. The civilian consumption of penicillin through doctors' prescriptions is increasing as the medical profession becomes more and more familiar with the use of the drug. This is a good portent for future consumption. A reduction in price to $2 per 100,000 units was announced. Wholesale discounts and army contracts provide for a much lower price. It is reported that the Government gets it for 52 cents. Mercury has declined slightly to $155 to $158 per flask, but mercurials have maintained their former prices in spite of reduction in cost of the metal. The use of benzyl benzoate as an insect repellent has reduced the available supplies of benzyl alcohol, benzyl salicylate, and benzyl acetate. There is also a scarcity at present of hydroquinone, hydrogen peroxide, and refined camphor. Butyl alcohol was reduced from 17.8 to 17.3 cents a pound; the acetate, from 17.25 to 16.90 cents per pound. Acetone is expected to become increasingly available; this is not true of methanol, however, since production facilities are still diverted to ammonia. Oxalic acid and benzaldehyde are in tight supply. Diethyl sulfate, methyl acetoacetate, and methyl amyl ketone advanced in price, while thioglycolic acid and dibutyl phthalate were reduced.

Coal tar chemicals. The supply of coal tar chemicals is still limited. Output of coal tar for the first two months of 1945 decreased from the same period last year.

Insecticides and fungicides. Available quantities of agricultural insecticides and fungicides are at their lowest level since the war began. Pyrethrum is expected to be made more available, but rotenone remains unchanged. Nicotine is extremely scarce due to the shortage of tobacco. Also scarce are copper fungicides, paris green, phenols and cresols, and some sulfur compounds.

An excellent review and correlation of the chemicals picture appeared recently as a publication of the U. S. Department of Commerce. Entitled "Chemical Trends and Developments," it is available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., for the price of 5 cents.

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CURRENT PRICES

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f.o.b. works are specified as such. Import chemicals are so designated.

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.

Purchasing Power of the Dollar: 1926 Average—$1.00 May, 1943, $0.893 May, 1944, $0.890 May, 1945, $0.870

		Current Market		1944 Low	1944 High	1943 Low	1943 High
Acetaldehyde, 99%, drs. wks.	lb.	.11	.14	.11	.14	.11	.14
Acetic Anhydride, drs,	lb.	.11½	.13	.11½	.13	.11½	.13
Acetone, tks, delv.	lb.	...	.07	...	.07	...	.07
ACIDS							
Acetic, 28%, bbls	100 lbs.	3.38	3.63	3.38	3.63	3.38	3.63
glacial, bbls.	100 lbs.	9.15	9.40	9.15	9.40	9.15	9.40
tks, wks.	100 lbs.	6.93	7.25	6.93	7.25	...	6.93
Acetylsalicylic, Standard USP	lb.	.40	.54	.40	.54	.40	.54
Benzoic, tech, bbls.	lb.	.43	.47	.39	.47	.39	.47
USP, bbls, 4,000 lbs. up	lb.	...	.54	...	.54	...	.54
Boric tech, bbls, c-l,	tons *a*	...	109.00	...	109.00	...	109.00
Chlorosulfonic, drs, wks.	lb.	.03	.04½	.03	.04½	.03	.04½
Citric, USP, crys, gran, bbls.	lb. *b*	.20	.21	.20	.21	.20	.24
Cresylic 50%, 210-215° HB, drs. wks. frt. equal	gal.	.81	.83	.81	.83	.81	.83
Formic, 85%-90% cbys.	lb.	.10	.11½	.10	.11½	.10½	.11½
Hydrofluoric, 30% rubber, dms.	lbs.	.08	.09	.08	.09	.08	.09
Lactic, 22%, lgt, bbls wks	lb.	.039	.0415	.039	.0415	.039	.0415
44%, light, bbls wks	lb.	.073	.0755	.073	.0755	.073	.0755
Maleic, Anhydride, drs.	lb.	.25	.26	.25	.26	.25	.26
Muriatic, 18° cbys	100 lb.	1.50	2.45	1.50	2.45	1.50	2.45
20° cbys, c-l, wks	100 lb.	...	1.75	...	1.75	...	1.75
22° cbys, c-l, wks	100 lb.	...	2.25	...	2.25	...	2.25
Nitric, 36°, cbys, wks	100 lbs. *c*	5.00	5.25	5.00	5.25	5.00	5.25
38°, c-l, cbys, wks	100 lbs. *c*	...	5.50	...	5.50	...	5.50
40°, c-l, cbys, wks	100 lbs. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks	100 lbs. *c*	...	6.50	...	6.50	...	6.50
Oxalic, bbls, wks	lb.	.11¼	.12½	.11¼	.12½	.11¼	.12½
Phosphoric, 100 lb. cbys, USP	lb.	.10½	.13	.10½	.13	.10½	.13
Salicylic, tech, bbls	lb.	.26	.42	.26	.42	.26	.44
Sulfuric, 60°, tks, wks	ton	...	13.00	...	13.00	...	13.00
66°, tks, wks	ton	...	16.50	...	16.50	...	16.50
Fuming 20% tks. wks	ton	...	19.50	...	19.50	...	19.50
Tartaric, USP, bbls	lb.	.70½	.71	.70½	.71	...	.70½
Alcohol, Amyl (from Pentane) tks, delv	lb.	...	.131	...	.131	...	.141
Butyl, normal, syn, tks	lb.	...	.10¾	...	.10¾	.10¾	.14¼
Denatured, CD 14, c-l drs	gal. *d*	...	.37	...	.57	...	.54½
Denatured, SD, No. 1, tks.	*d*	...	.50	...	.50	...	.50
Ethyl, 190 proof tks	gal.	...	17.60	...	17.60	..	11.90
Isobutyl, ref'd, drs	lb.	...	.086	...	.086	...	.086
Isopropyl ref'd, 91%, dms	gal.	.37½	.41	.37½	.66½	.39	.66½
Alum, ammonia, lump, bbls, wks	100 lb.	...	4.25	...	4.25	...	4.25
Aluminum, 98-99%	100 lb.	15.00	16.00	15.00	16.00	15.00	16.00
Chloride anhyd l.c.l. wks	lb.	.09	.12	.08	.12	.08	.12
Hydrate, light, bgs.	lb.	...	.14½	...	.14½	.14½	.15
Sulfate, com'l. bgs, wks, c-l	100 lb.	1.15	1.25	1.15	1.25	1.15	1.25
Sulfate, iron-free, bgs, wks	100 lb.	1.85	2.10	1.85	2.50	1.75	2.50
Ammonia anhyd, cyl	lb.	...	.14½	...	.14½	...	.16
Ammonium Carbonate, USP, lumps, dms	lb.	.08¾	.09¼	.08½	.09¼	.08¼	.09¼
Chloride, whi, bbls, wks,	100 lb.	4.45	5.15	4.45	5.15	4.45	5.15
Nitrate, tech. bags, wks.	lb.	.0435	.0850	.0435	.0850	.0435	.0850
Oxalate pure, grn. bbls.	lb.	...	.23	.27	.33	.27	.33
Perchlorate, kgs	lb.	No stocks		.55	.65	.55	.65
Phosphate, dibasic tech. bgs	lb.	.07	.07¾	.07	.07¾	.07¼	.08½
Stearate, anhyd. dms.	lb.	...	.34	...	.34	...	.34
Sulfate, dms, bulk	ton	28.20	29.20	28.20	29.20	28.20	30.00
Amyl Acetate (from pentane) c-l, drs, delv	lb.	...	.15½	...	.15½	...	.15½
Aniline Oil, drs	lb.	.11½	.12½	.11½	.12½	.11½	.12½
Anthraquinone, sub, bbls.	lb.	...	.70	...	.70	...	.70
Antimony Oxide, bgs	lb.	.15	.15½	.15	.15½	.15	.15½
Arsenic, whi, kgs—powd.	lb.	.04	.04¾	.04	.04¾	.04	.04¾

USP $25 higher; Prices are f.o.b. N. Y., Chicago, St. Louis, deliveries ½c higher than NYC prices; *y* Price given is per gal; *c* Yellow grades 25c per 100 lbs less in each case; *d* Prices given are Eastern schedule. *a* Powdered boric acid $5 a ton higher; *b* Powdered citric acid is ½c higher.

	Current Market	1944 Low	1944 High	1943 Low	1943 High
Barium Carbonate precip, wks, bgs. ton	60.00	75.00	55.00	75.00	55.00	65.00
Chloride, tech, cyst, bgs, zone 1 ton	73.00	78.00	73.00	90.00	77.00	90.00
Barytes, floated, bbls. ton	...	36.00	...	36.00	...	36.00
Bauxite, bulk mines ton	7.00	10.00	7.00	10.00	7.00	10.00
Benzaldehyde,tech,cbys,dms lb.	.45	.55	.45	.55	.45	.55
Benzene (Benzol), 90%, tks, ft all'd gal.	...	.15	...	.15	...	.15
Benzyl Chloride, cbys lb.	.22	.24	.22	.28	.22	.25
Beta-Naphthol, tech, bbls, wks ton	.23	.24	.23	.24	.23	.24
Bismuth metal, ton lots lb.	...	1.25	...	1.25	...	1.25
Blanc Fixe, 66⅔% Pulp, bbls, wks ton	h 40.00	46.50	40.00	46.50	40.00	46.50
Bleaching Powder, wks,100 lb.	2.50	3.60	2.50	3.60	2.50	3.60
Borax, tech, c-l, bgs ton	i ...	45.00	...	45.00	...	45.00
Bordeaux Mixture, drs lb.	.11	.11½	.11	.11½	.11	.11½
Bromine, cases lb.	.21	.23	.21	.30	.25	.30
Butyl, acetate, norm. drs, lb.	.1790	.1840	.1755	.1945	.1575	.1840
Cadmium Metal lb.	.90	.95	.90	.95	.90	.95
Calcium, Acetate, bgs, 100 lb.	3.00	4.00	3.00	4.00	3.00	4.00
Carbide, drs ton	50.00	90.00	50.00	95.00	50.00	95.00
Carbonate, c-l bgs, ton	18.00	22.00	18.00	22.00	18.00	22.00
Chloride, flake, bgs c-l ton	18.50	35.00	18.50	35.00	18.50	35.00
Solid, 73-75% drs, c-l, ton	18.00	34.50	18.00	34.50	18.00	31.50
Gluconate, U.S.P., drs. lb.	.57	.59	.57	.59	.57	.58
Phosphate, tri, bbls, cl. lb.	...	.0635	.0635	.0785	.0635	.0785
Camphor, U.S.P., gran, powd, bbls lb.	.69	.71	.68½	.71	.68½	.70½
Carbon Bisulfide, 55-gal drs lb.	.05	.05¾	.05	.05¾	.05	.05¾
Dioxide, cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, Zone 1, 52½ gal. drms lb.	.78	.80	.73	.80	.73	.80
Casein, Acid Precip, bgs, 100 or more lb.	.22	.22¾	...	.24	...	.24
Chlorine, cyls, lcl, wks, contract lb.	...	.07¼	...	.07¼	...	.07¼
cyls, c-l, contract lb.	j ...	.05¼	...	.05¼	...	.05¼
Liq, tk, wks, contract 100 lb.	...	1.75	...	1.75	...	1.75
Chloroform, tech, drs lb.	.20	.23	.20	.23	.20	.23
Coal tar, bbls, crude bbl.	8.25	8.75	8.25	8.75	8.25	8.75
Cobalt, Acetate, bbl lb.	...	.83¾	...	.83¾	...	.83¾
Oxide, black kgs lb.	...	1.84	...	1.84	...	1.84
Copper, metal 100 lb.	12.00	12.50	12.00	12.50	12.00	12.50
Carbonate, 52-54%, bbls. lb.	.19½	.20½	.19½	.20½	.19½	.20½
Sulfate, bgs, wks crypt. 100 lb.	5.00	5.50	5.00	5.50	5.00	5.50
Copperas, bulk, c-l, wks ton	...	14.00	...	14.00	...	14.00
Cresol, USP, drs lb.	.10¾	.11¾	.10¾	.11¾	.10¾	.11¾
Cyanamid, bgs ton	1.52½	1.62½	1.52½	1.62½	1.52½	1.62½
Dibutylamine, c-l, drs, wks lb.	...	.66	...	.61	...	.61
Dibutylphthalate, drs lb.	.1900	.2359	.1780	.2659	.2060	.2300
Diethylaniline, lb drs lb.	...	.40	...	.40	...	.40
Diethyleneglycol, drs, wks lb.	.14	.15	.14	.15½	.14	.15½
Dimethylaniline, dms,cl.,lcl lb.	.21	.22	.21	.24	.23	.24
Dimethyl phthalate, drs lb.	.1875	.1925	.1875	.1925	.1875	.2050
Dinitrobenzene, bbls lb.	...	.18	...	.18	...	.18
Dinitrochlorobenzene, dms lb.	...	.14	...	.14	...	.14
Dinitrophenol, bbls lb.	...	.22	...	.22	...	.22
Dinitrotoluene, dms lb.	...	.18	...	.18	...	.18
Diphenyl, bbls lcl. wks lb.	.16	.20	.16	.20	.15	.20
Diphenylamine bbls lb.	...	.25	...	.25	...	.25
Diphenylguanidine, drs lb.	.35	.37	...	.35	.35	.37
Ethyl Acetate, tks, frt all'd lb.	.1070	.1175	.1070	.1175	.107	.110
Chloride, drs lb.	.18	.20	.18	.20	.18	.20
Ethylene Dichloride, lcl. wks, E. Rockies, dms lb.	.0842	.0941	.0842	.0941	...	.0842
Glycol, dms, cl. lb.	...	.10	...	.10	...	.10
Fluorspar, No. 1, grd.95-98% bulk, cl-mines ton	...	37.00	...	37.00	...	37.00
Formaldehyde, bbls, cl & lcl lb.	.0520	.0570	.0520	.0570	.0550	.0575
Furfural tech, dms, c-l,wks lb.	...	.13	...	.13	...	.12½
Fusel Oil, refd, dms, dlvd lb.	.18½	.19½	.18½	.19½	.18½	.19½
Glauber's Salt, Cryst,c-l.,bgs, bbls. wks 100 lb.	1.05	1.25	1.05	1.25	1.05	1.25
Glycerin dynamite, dms, c-l, lb.	...	14½	...	.14½	...	.18¾
Crude Saponification, 80% to refiners tks lbs.	.09½	.10	.09½	.10	...	.12¾

GUMS

Gum Arabic, amber sorts bgs lb.	.11¾	.12	.11¾	.14	.13½	.17½
Benzoin Sumatra, CS lb.	.52	1.00	.52	1.00	.52	1.00
Copal, Congo lb.	...	.55¾	...	.55¾	...	.55¾
Copal, East India, chips lb.	...	.53¾	...	...	...	...
Macassar dust lb.	...	.07¾	...	.07¾	.07¾	.11¾
Copal Manila,	.13½	.15½	.13½	.15½	.13½	.15½
Copal Pontianak, bold c-l lb.	...	.23¾	...	.23¾	...	.23¾
Karaya, bbls, bxs, dms, lb.	.15	.46	.15	.46	.14	.40

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

y Price given is per gal.

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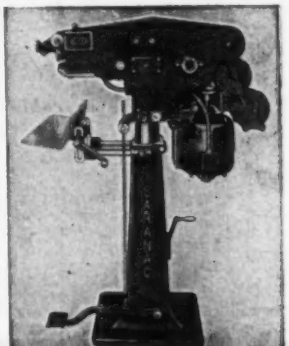

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References:

Swiss Bank Corporation, 15 Nassau Street, New York

		Current Market	1944 Low	1944 High	1943 Low	1943 High
Kauri, N. Y.						
Superior Pale XXX	lb.	...	.65¼	...	.65¼	...	.65¼
No. 3	lb.	...	.22	...	.23	...	.23
Sandarac, cs	lb.	...	.99½	...	.99½	1.40	nom.
Tragacanth, No. 1, cases	lb.	4.50	5.00	4.00	5.25	4.00	5.25
No. 3	lb.	2.25	2.50	1.10	3.50	1.10	1.20
Yacca, bgs	lb.	.06	.07¼	.06	.07¼	.06	.07¼
Hydrogen Peroxide, cbys	lb.	.15½	.18½	.15½	.18½	.15½	.18½
Iodine, Resublimed, jars	lb.	2.00	2.10	2.00	2.10	2.00	2.10
Lead Acetate, cryst, bbls	lb.	...	.12½	...	.12½	...	.12½
Arsenate basic, bg, lcl	lb.	.11½	.12	.11½	.12	.11½	.12
Nitrate, bbls	lb.	...	.12½	...	.12½	...	.12½
Red, dry, 95% Pb_3O_4 bbls.	lb.	.09	.10¾	.09	.11	.09	.11
97% Pb_3O_4, bbls delv	lb.	.09½	.11	.09¼	.11	.09¼	.11
98% Pb_3O_4, bbls delv	lb.	.09½	.11¼	.09½	.11¼	.09½	.11¼
White, bbls	lb.	.08¼	.08¾	.08¼	.08¾	.08¼	.08¾
Basic sulfate, bbls, lcl	lb.	.07¼	.08	.07¼	.08	.07¼	.08
Lime, Chem., wks, bulk	ton	6.25	13.00	6.25	13.00	6.25	13.00
Hydrated, f.o.b. wks	ton	8.50	16.00	8.50	16.00	8.50	16.00
Litharge, coml, delv. bbls	lb.	.08	.09¾	.08	.09¾	.08	.09¾
Lithopone, ordi., bgs	lb.	.04¼	.04½	.04¼	.04¾	.04¼	.04¾
Magnesium Carb, tech, wks	lb.	.06¼	.09¾	.06¼	.09¾	.06¼	.09¼
Chloride flake, bbls, wks c-l	ton	...	32.00	...	32.00	...	32.00
Manganese, Chloride, Anhyd. bbls	lb.	.15	.18	.15	.18	.14	nom.
Dioxide, Caucasian bgs, lcl	ton	74.75	79.75	...	74.75	...	74.75
Methanol, pure, nat, drs gal	*l*	.63	.76	.63	.76	.63	.76
Synth, drs cl	gal. *m*	.31	.38	.31	.40½	.34½	.40½
Methyl Acetate, tech tks	lb.	.06	.07	.06	.07	.06	.07
C.P. 97-99%, tks, delv	lb.	.09½	.10½	.09½	.10½	.09½	.10½
Chloride, cyl	lb.	.32	.40	.32	.40	.31	.40
Ethyl Ketone,tks,frt all'd	lb.	...	.08	...	.08	...	.08
Naphtha, Solvent, tks	gal.	...	.27	...	.27	...	.27
Naphthalene, crude, 74°, wks tks	lb.	...	.0275	...	.0275	...	.0275
Nickel Salt, bbls, NY	lb.	.13	.13½	.13	.13½	.13	.13½
Nitre Cake, blk	ton	...	16.00	...	16.00	...	16.00
Nitrobenzene, drs, wks	lb.	.08	.09	.08	.09	.08	.09
Orthonisidine, bbls	lb.	...	.70	...	.70	...	.70
Orthochlorophenol, drs	lb.	.25	.27	.25	.32	...	.32
Orthodichlorobenzene, drms	lb.	.07	.08	.07	.08	.07	.08
Orthonitrochlorobenzene, wks	lb.	.15	.18	.15	.18	.15	.18
Orthonitrotoluene, wks,dms	lb.	...	.09	...	.09	...	.09
Paraldehyde, 98%, wks lcl.	lb.	...	.12	...	.12	...	.12
Chlorophenol, drs.	lb.	.26½	.28	.25	.32	...	.32
Dichlorobenene, wks	lb.	.11	.15	.11	.15	.11	.15
Formaldehyde, drs, wks	lb.	.21	.22	.23	.24	.23	.24
Nitroaniline, wks, kgs	lb.	.43	.45	.43	.45	.43	.45
Nitrochlorobenzene, wks	lb.	...	.15	...	.15	...	.15
Toluenesulfonamide, bbls	lb.	...	.70	...	.70	...	.70
Toluidine, bls, wks	lb.	...	.48	...	.48	...	.48
Penicillin, ampules per 100,000 units		...	1.10	1.10	4.50	...	...
Pentaerythritol, tech	lb.	.29	.33	.29	.33	.29	.35½

PETROLEUM SOLVENTS AND DILUENTS

Lacquer diluents, tks, East Coast	gal.	...	.11½	...	.11½	...	.11
Naphtha, V.M.P., East tks, wks	gal.	...	.11	...	.11	...	.11
Rubber solvents, East, tks, wks	gal.	...	.11	...	.11	...	.11
Stoddard Solvents, East, tks, wks	gal.	...	.10	...	.10	...	.09½
Phenol, U.S.P., drs	lb.	.10½	.11¼	.10½	.11¼	.10½	.13¼
Phthalic Anhydride, cl and lcl, wks	lb.	.13	.14	.13	.14	.13	.15½
Potash, Caustics, 88-92%, wks, sol.	lb.	.06¼	.06¾	.06¼	.06¾	.06¼	.06¾
flake, 88-92%	lb.	.07	.07½	.07	.07½	.07	.07½
liquid, 45% basis, tks	lb.	...	.02¾	...	.02¾	...	.0275
dms, wks	lb.	.03⅛	.03½	.03	.03½	.03	.03½
Carbonate, hydrated 83-85%	lb.	...	.05½	.05½	.05¾	.05½	.05¾
Chlorate crys, bgs, wks	lb.	.11	.13	.11	.13	.11	.13
Chloride, crys, tech, bgs, kgs	lb.	.08	nom.	.08	nom.	.08	nom.
Cyanide, drs, wks	lb.	...	.55	...	.55	...	.55
Iodide, bots., or cans	lb.	1.44	1.48	1.44	1.48	1.44	1.48
Muriate, dom, 60-62-63% K_2O bulk unit-ton	ton	...	.53½	...	.53½	.53½	.56
Permanganate, USP, wks dms	lb.	.20½	.21	.20½	.21	.20½	.21
Sulfate, 90%, basis, bgs	ton	...	36.25	...	36.25	...	36.25
Propane, group 3, tks	gal.	...	.03¾	...	.03¾	...	.03¾
Pyridine, ref., drms	lb.	.45	.45½	.45	.46	.45½	.46
R Salt, 250 lb bbls, wks	lb.	...	.65	...	.65	...	.65
Resorcinol, tech., drms, wks	lb.	.68	.75	.68	.75	.68	.75
Rochelle Salt, cryst	lb.	.43½	.47	.43½	.47	.43½	.47
Salt Cake, dom. blk wks	ton	...	15.00	...	15.00	...	15.00

l Producers of natural methanol divided into two groups and prices vary for these two divisions; *m* Country is divided in 4 zones, prices varying by zone.

* Spot price is ½c higher.

		Current Market	1944 Low	1944 High	1943 Low	1943 High
Saltpetre, grn, bbls	100 lb.	8.20	8.20	8.60	8.20	8.60
Shellac, Bone dry, bbls	lb. *r*	.42½	.42½	.46	.42½	.46
Silver Nitrate, 100 oz, bots	oz.	...	.32⅜	.32⅜	...	.32⅜
Soda Ash, 58% dense, bgs, c-l, wks	100 lb.	...	1.15	1.15	...	1.15
58% light, bgs cl	100 lb.	1.05	1.13	1.13	...	1.13
Caustic, 76% flake drms, cl	100 lb.	...	2.70	2.70	...	2.70
76% solid, drms,cl	100 lb.	...	2.30	2.30	...	2.30
Liquid, 47-49%, sellers, tks	100 lb.	...	1.95	1.95	...	1.95
Sodium Acetate, anhyd. dms	lb.	.08½	.10	.10	.05	.06
Benzoate, USP dms	lb.	.46	.52	.46	.52	.46
Bicarb, tech., bgs., cl., works	100 lb.	1.55	1.90	2.05	...	...
Bichromate, bgs.wks l.c.l.	lb.	.07⅞	.08½	.08⅛	...	.07¾
Bisilfite powd, bbls, wks	100 lb.	3.00	3.60	3.60	3.00	3.60
35° bbls., wks	100 lb.	1.40	1.65	1.65	1.40	1.65
Chlorate, kgs, wks c.l.	lb.	...	.06¼	.06¼	...	.06¼
Cyanide, 96-98%, wks	lb.	.14½	.15	.15	.14½	.15
Fluoride, 95%, bbls, wks	lb.	.07¼	.08¼	.08¼	.07¼	.08¼
Hyposulfite, cryst, bgs, cl, wks	100 lb.	...	2.25	2.25	...	2.25
Metasilicate, gran, bbl, wks c-l	lb.	...	2.50	2.50	...	2.50
Nitrate, imp, bgs	ton	...	33.00	33.00	...	33.00
Nitrite, 96-98% bbl. cl. lb.		...	.06¾	.06¾	...	.06¾
Phosphate, di anhyd. bgs. wks.	100 lb.	6.00	7.25	7.25	6.00	7.25
Tri-bgs, cryst, wks	100 lb.	2.70	3.40	2.70	3.40	2.70	3.45
Prussiate, yel, bbls. wks	lb.	...	.11	.10	.11	.10	.11
Silicate, 52°,drs. wks	100 lb.	1.40	1.80	1.40	1.80	1.40	1.80
40°, drs, wks, c-l	100 lb.	...	.80	...	.80	...	.80
Silicofluoride, bbls NY	lb.	.06½	.10	.06½	.12	.05	.12
Sulfate tech. Anhyd, bgs	100 lb.	1.70	1.95	1.70	1.90	1.70	1.90
Sulfide, cryst c-l, bbls, wks	100 lb.	...	2.40	...	2.40	...	2.40
Solid, bbls, wks	lb.	3.15	3.90	3.15	3.90	3.15	3.90
Starch, Corn, Pearl, bgs	100 lb.	...	4.08	...	4.08	...	3.47
Potato, bgs, cl	lb.	...	.0637	...	.0637	...	.0637
Rice, bgs	lb.	no stocks		no stocks		.09½	.10¼
Sweet Potato, bgs	100 lb.	.09	.09¼	.07½	.09¼	...	.07½
Sulfur, crude, mines	ton	...	16.00	...	16.00	...	16.00
Flour, USP, precp, bbls, kgs	lb.	.18	.30	.18	.30	.18	.30
Roll, bbls	100 lb.	2.40	2.90	2.40	2.90	2.40	2.90
Sulfur Dioxide, liquid, cyl	lb.	.07	.08¾	.07	.09	.07	.08
tks, wks	lb.	...	.04	.04	.06	.04	.06
Talc, crude, c-l, NY	ton	...	13.00	...	13.00	...	13.00
Ref'd, c-l, NY	ton	13.00	21.00	13.00	21.00	13.00	21.00
Tin, crystals, bbls, wks	lb.	no stocks		no stocks		no stocks	
Metal	lb.	...	.52	...	.52	...	.52
Toluol, drs, wks	gal.	...	.33	...	.34½	...	.33
tks, frt all'd	gal.	...	.28	...	.28	...	.28
Tributyl Phosphate, dms lcl, frt all'd	lb.	...	.49	...	.49	...	.47
Trichlorethylene, dms, wks	lb.	.08	.09	.08	.09	.08	.09
Tricresyl phosphate tks.	lb.	...	.24	...	.24	...	...
Triethylene glycol, dms	lb.	.18½	.19½	.18½	.26	...	.26
Triphenyl Phos, bbls	lb.	.31	.32	.31	.32	.31	.32
Urea, pure, cases	lb.	...	.12	...	.12	...	.12
Wax, Bayberry, bgs	lb.	no stocks		.25	nom.	.25	.26
Bees, bleached, cakes	lb.	...	.60	...	.60	...	.60
Candelilla, bgs crude	ton	...	.38	.34½	.48	.38	.48
Carnauba, No. 1, yellow, bgs, ton	lb.	...	.83¼	...	.83¼	...	.83¼
Xylol, Indus. frt all'd, tks, wks	gal.	...	.27	...	.27	...	.27
Zinc Chloride tech fused, wks	lb.	.05	.0535	.05	.0535	.05	.0535
Oxide, Amer, bgs, wks	lb.	.07¼	.07½	.07	.07½	.07	.07½
Sulfate, crys, bgs	100 lb.	3.40	4.15	3.40	4.35	3.60	4.35

Oils and Fats

Babassu, tks, futures	lb.	...	.111	...	.111	...	.111
Castor, No. 3, bbls	lb.	.13¾	.14¼	.13¾	.14¼	.13¾	.14¼
China Wood, drs, spot NY	lb.	.39	.41	.39	.41	...	.39
Coconut, edible, drs NY	lb.	...	.0985	...	.0985	...	.0985
Cod Newfoundland, dms	gal.	.85	.88	.85	.90	...	.90
Corn, crude, tks, wks	lb.	...	.12¾	...	.12¾	...	.12¾
Linseed, Raw, dms, c-l	lb.	...	.1550	.1510	.1560	...	.1530
Menhaden, tks	gal.	...	.1225	...	.1225	...	.1225
Light, pressed, drs l.c.l.	lb.	...	.1300	...	.1200	.1305	.1307
Palm, Niger, dms	lb.		.0865	..	.0865	...	.0865
Peanut, crude, tks, f.o.b. wks	lb.	.12⅞	.13⅞	.12⅞	.13⅞	...	.18
Perilla, crude dms, NY	lb.	no stocks		...	.245	...	.245
Rapeseed, New Orleans, bulks	lb.	...	.1156½	...	.1156½	...	.1150
Red, dms	lb.	.13¼	.14¼	.13¼	.14¼	...	...
Soy Bean, crude, tks, wks	lb.	...	.1175	...	.1175	...	.1175
Tallow, acidless, bbls	lb.	...	.14¼	...	.14¼	...	.14¼

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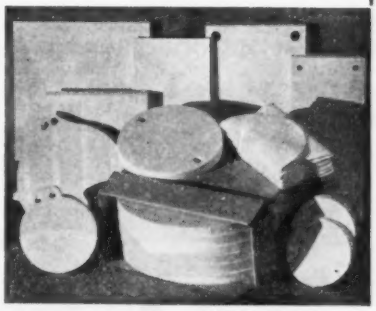

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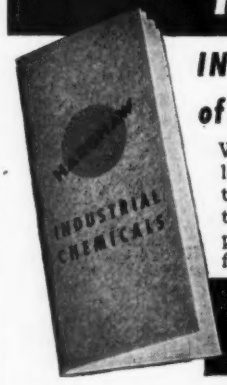

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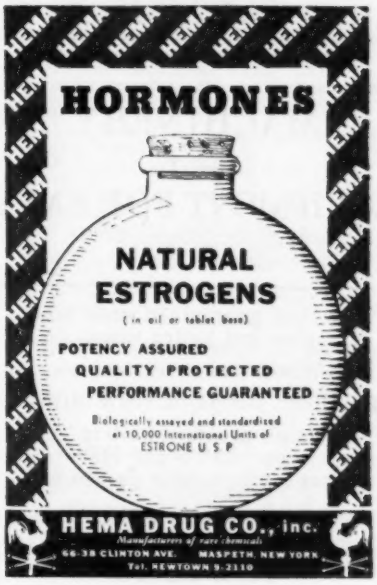
EXTENDERS
CHEMICAL SOLVENTS
Incorporated
60 PARK PLACE NEWARK 2, N. J.

Semi-Carbazide Hydrochloride
•
Hydrazine Sulphate
Commercial and C. P.
•
Hydrazine Hydrate
85% and 100%
FAIRMOUNT CHEMICAL CO., INC.
Manufacturers of Fine Chemicals
600 Ferry St. Newark 5, N. J.

NEW YORK



IDEAL REPLACEMENT PRODUCTS
DELTO GUM BENZOIN (synthetic)
•
DELTO ZINC OXIDE 99.9% PURE
(replaces titanium dioxide)
•
MENTHOL U.S.P. AND SNYTHETIC
DELTO CARBON BLACK
DELTON PRODUCTS CORP.
489 FIFTH AVENUE. NEW YORK 17, N. Y.

RHODE ISLAND

J. U. STARKWEATHER CO.
INCORPORATED
241 Allens Ave.
Providence, R. I.
INDUSTRIAL CHEMICALS
TEXTILE SPECIALTIES

GEORGE MANN & CO., INC.
FOX POINT BLVD.
PROVIDENCE 3, R. I.
PHONE — GASPEE 3466
TELETYPE PROV. 75
Branch Office
250 STUART STREET, BOSTON, MASS.
PHONE — HUBBARD 0661
INDUSTRIAL CHEMICALS
RED OIL
STEARIC ACID

PENNSYLVANIA

FOR ALL INDUSTRIAL USES

AFCO BRAND

CHEMICALS

SINCE 1855

Spot Stocks
Technical Service

ALEX C. FERGUSSON CO.

450 Chestnut St. PHILADELPHIA, PA.
and Allentown, Pa.
Lombard 2410-11-12

MACHINERY and EQUIPMENT FOR SALE

New and guaranteed used steel pipe and boiler tubes.

Wood and steel tanks.

Buildings, pumps, valves & fittings.

High pressure boilers from 300 to 633 HP from 160# to 200# pressure.

Write for our list.

JOS. GREENSPON'S SON PIPE CORP.
National Stock Yards,
St. Clair Co., Ill.

FOR SALE

3—Stainless Steel Jacketed Kettles—150 gal.
1—Dorrco Rubber-lined 4" Diaphragm Pump.
1—Buffalo Vertical Sump Pump, 4" suction.
1—DeLaval Turbine - driven, Centrifugal Pump—2 stage, HD. 286', G.P.M. 1050
3—York Steam-driven Ice Machines, 1, 1½, 2½, Ton Units.
1—Drake Alcohol Recovery Steel Still.
7—New Steel Storage Tanks, welded on 3 cradles, 5'4" dia. x 24' long, 3/16" plate.
5—Praudler Reaction Kettles, 150-300 gal.
1—Tolhurst 32" b. dr., Copper basket, cent.
1—Alsop Syphon Filler—5 spout
4—Heating Coils, 1½"—#80 pipe, welded construction, dia. of coils 30" x 15 turns New 12" wide, 10' long sections, Skate & Solid Roller Portable Gravity Conveyor.

Girard Machinery & Equipment Co.
949 N. 9th St. Lom. 6744 Phila. 23, Pa.

FOR SALE

About 150 lbs. Aluminum Aceto Tartrate Granular

Approximately 25 x 10 gm. packages of Cignolin (Anthralin)

Box 2013

RUBBER LINED TANKS

Some Unlined — All Open Top.
Various Sizes — Immediate Delivery.
No Priorities Required.
Never Used
APEX IRON & METAL COMPANY
2204 South Laflin Street
Chicago 8, Illinois.

SPECIALS!

Stainless Steel Pasteurizing Equipment, including Holding Tank; Precision Heater and Circulator; Stainless Steel Single Drum Dryer; Stainless Steel Freeze Roll, Proctor & Schwartz Continuous "Airlay" Dryer.

DISTILLING COLUMNS:

48" DIA. C.I. RECTIFYING COLUMNS. Containing 34 Bubble Cap Type Plates, 6 caps per plate. Complete with coolers.
78" DIA. C.I. RECTIFYING COLUMNS. 30 Bubble Cap Type Plates with 12 caps per plate. Complete with coolers, etc.
8'4" to 10'0" STEEL COLUMN containing 19—8'4" dia. and 9—10'0" dia. Bubble Cap Type Plates. Drawings available.
48" DIA. EVERDUR COLUMN—Bubble Cap Type Plates. An exceptional value.
TANKS, COPPER, STEEL, BRASS, ALUMINUM, STAINLESS—Large Stock.
AMMONIA COOLERS.
HAMMER MILL: Williams, Cap. 1,000 to 1,200 lbs. corn per hour.
3—JEFFREY SWING HAMMER SHREDDERS—Type E—Size 42"x36". Compl. with Westinghouse 100 H.P. motor, etc.
PUMPS—CENTRIFUGAL AND STEAM, all sizes. Bronze or Iron.
TUBING & PIPE—Stainless, brass, aluminum, copper.
YEAST CULTURE MACHINE—All copper.
ACE OIL BURNER—excellent condition.
LAWRENCE TRIPLE EFFECT EVAPORATOR. Complete in one body.
9—COIL-TYPE VACUUM PANS. (Complete with Condensers, Catch-alls, etc.)
2—WORTHINGTON CONDENSERS, 1,150 sq. ft. surface, each—complete with simplex pumps. Others from 100 to 1000 sq. ft. of surface.

CLOSE-OUT: VALVES—ALL SIZES

SURPLUS EQUIPMENT NEEDED
A single piece or a complete plant.
Send us your list.

Write for our Complete List

ORELAND EQUIPMENT CO.
P. O. BOX "E", ORELAND, PENNA.

MACHINERY FOR SALE

2—Erie Boilers HRT—180 HP with Stokers.
2—Grain Storage Bins, 2500 Bu. each.
1—Vertical Jacketed Cooker, 3000 gallons, with agitator.
1—Copper Steam Jacketed Still Pot, 5500 gallons capacity.
1—Standard Knapp Wrap-Around Labeler,
1—Frederking Cast Iron Still.
5—Cast Iron Receivers.
1—36" diameter Galvanized Evaporator.
2—Jacketed Steel Tanks, 4' x 8'.
1—Horizontal Jacketed Mixer, 7' diameter x 10' long.
1—Filler Machine Company Four Piston Filler.
6—Semi-automatic Labelers.
2—Howe Weigh-O-Graph Scales, 2 oz. to 150 lbs.
30—Steel Tanks, 800 to 10,000 gallon capacity.
1—Ansonia Water Still, 200 gallons per hour.
Also: Cast Iron Filter Presses—Pumps—Air and Ammonia Compressors—Dough Mixers, New Stainless Steel Tanks and Kettles.

Write For Latest Stock List

PERRY EQUIPMENT & SUPPLY COMPANY
1515 W. Thompson St. Phila. 21, Penna.

For Sale, developments:

Non-corrosive, variable capacity chlorine metering-control apparatus; small production diaphragm electrolytic cell. Box 2017.

LIQUIDATION

MACHINERY & EQUIPMENT

of

LARGE CHEMICAL PLANT

located at

ANNISTON, ALABAMA

A FEW ITEMS

1—42" TURBO MIXER with 7½ H.P. motor.
COMPLETE YORK AIR CONDITIONING PLANT, capacity 49 tons refrigeration, to handle 11,000 cu.ft. air per minute.
1—24 Truck Tunnel DRYER.
5—ROTARY DRYERS, 2 x 24', 4 x 30', 6 x 40'.
3—Sets Walker Swenson 3-deck CRYSTALLIZERS.
3—Jeffrey 12 x 24 single deck VIBRATING SCREENS.
1—Battery of two 3 x 5 TYLER HUMMER SCREENS, 3-deck.
2—Fansteel Hydrochloric ACID ABSORPTION SYSTEMS.
1—Sturtevant Balanced ROLL CRUSHER, 30" x 16".
1—1,000 Gal. Duriron KETTLE.
Miscellaneous: Tanks—Stainless steel lined, rubber lined, lead lined, and proof brick lined; Bucket Elevators; Agitators; Pumps; Motors; Crushing Equipment; etc.

Arrange to Inspect.
Send for Descriptive Circular.

PARTIAL LIST OF STOCK AT NEWARK SHOPS

2—Bufflovak 6' dia. Jack. Vacuum CRYSTALLIZERS or VACUUM PAN DRYERS.
3—DRY POWDER MIXERS various sizes, to 3000 lbs.
1—W. & P. MIXER size 21-X-BB, jacketed, 625 Gal.
5—RAYMOND PULVERIZERS; 4-Roll Low Side; No. 3 No. 1, No. 0000.
1—4' x 6' OLIVER CONTINUOUS FILTER; 2—8' x 8'.
1—Day No. 30 Imperial Jack. MIXER, 75 Gal.
29—CENTRIFUGAL EXTRACTORS, 12" to 72" bronze and steel baskets, belt and motor drives.
2—8' x 30" Hardinge Conical Silex Lined PEBBLE MILLS, also 6' x 36".
5—ROTARY KILNS, 6' x 60', 8' x 125', 8' x 135'.
10—Dopp C. I. jacketed KETTLES, 25 Gal. to 100 Gal.; 30-steel, cast iron, jack. up to 2000 gals.
3—ROLLER MILLS 6'6" x 14", 12 x 30, 16 x 40, water cooled.
1—Pneumatic Scale Co. Auto. 6 head CAPPER & CAP FEEDER, M.D.
1—450 Gal. GLASS LINED jack., agit. KETTLE; 2—150 Gal. Jack. Agit.; 2—200 Gal. Jack.
1—Ball and Jewell #2 Rotary Cutter.

2—4-Roll RAYMOND HIGH SIDE MILLS, equipped for vacuum air separation—one with latest "whizzer" separator, with double cone vacuum separator. Each including exhauster, cyclone collector and inter-connecting piping.

Consolidated Products Co., Inc.
14-18 Park Row New York 7, N. Y.
We Buy and Sell from a Single Item to a Complete Plant

AUTOCLAVES

1—42" dia. x 24'-4" Vertical, Forge Welded Steel, 600 lbs. Pressure—1300 gals.
1—4' x 6' Vertical, Iron Body, Steel Jacketed, 200 lbs. Pressure—600 gals.
1—4' x 15' Vertical Steel, Jacketed, 125 lbs. Pressure—3400 gals.
2—3' x 10' Horizontal, Steel, Jacketed, 300 lbs. Pressure—800 gals.
1—10' x 25' Vertical or Horizontal, Forge Welded Steel, Jacketed, 100 lbs. Pressure.

AGITATOR DRIVES

2—De Laval Type E Vertical Worm Gear, Ratio 70 to 1, 1200 R.P.M. Input—10 H.P.
1—D.O. James—Size 1168 Vertical Worm Gear, Ratio 28.33 to 1, with base plate for 5 H.P. motor drive.
1—D.O. James—Size 1300 Vertical Worm Gear, Ratio 82 to 1, with base plate for 5 H.P. motor drive.
1—General Electric Vertical Gear Reduction Output Speed 5 R.P.M.—7½ H.P. G.E. Motor—Totally Enclosed—220 volts—3 phase—60 cycle.

CONDENSERS

1—Elliott Ehrhart Iron Body Surface Condenser—two pass 245 sq. ft. Surface—½" brass tubing and Tube sheet.
1—All copper condenser, Coil Type, 60 sq. ft. surface, removable from shell.

CRYSTALLIZERS

5—4' x 24' x 2'6" Deep Stainless Clad Steel, Jacketed—1800 gals.

DRYERS

1—No. 23 Devine Vacuum Shelf Dryer—13 shelves—59" x 78". 2⅜" between shelves, complete with unit surface condenser and vacuum pump.
3—Bartlett & Snow Vertical Steel, Jacketed, 10' dia. x 4' high, Agitators, Reducers, 2 H.P. Motors.

EXTRACTORS

7—Burhardt & Viersen, sizes 32" & 40" dia., bronze, rubber-covered and Lith-coated baskets.

EXTRACTORS

6—10" Centrifugal Extractors.
1—38" " "
1—32" " "
1—26" " "
1—20" " "
Bronze, Rubber and Litheoated Baskets, Belt and Direct Drives.

FRACTIONATING COLUMNS

1—24" dia. Cast Iron—40 Sections, each 6" high with dome and bottom sections—14 bubble caps per section.
1—18" dia.—Cast Iron—with Dephlegmator—15 sections, each 6" high—2 top & bottom sections each 18½" high.

KETTLES

1—8' dia. x 10' deep, Iron body with heating coil, agitator & drive, 3000 gals.
2—4' dia. x 4'6" deep Iron body, anchor agitator and newport drive, 400 gals.
1—4' dia. x 4' deep Iron body, agitator & drive, 400 gals.
1—3'6" dia. x 5' deep, steel jacketed, lead lined with agitator, 350 gals.
1—4'6" dia. x 3' deep, steel jacketed, with agitator and drive, 350 gals.
1—3'6" dia. x 5' deep cast steel, jacketed, no drive or agitator, 350 gals.

PUMPS

2—Wilfley Model AB Centrifugal—7½ H.P. motor—one has stainless impeller & casing—2" inlet, 1½" discharge.
1—Shriver Diaphragm 3A—lead liquid ends, 90 gals., motor drive.
1—Shriver Diaphragm 3A—Rubber lined, 90 gals., motor chain drive.
4—Vacuum single phase stokes—size 8" x 6", pulley drive.
1—Quimby 4 stage Centrifugal, 500 gals.—75 H.P. G.E. motor.
1—American Well 2 stage Centrifugal, 350 gal. 30 H.P.G.E. motor, Magnetic Starter.
2—Gould Triplex Plunger—size 8" x 10"—400 gals. Pulley Drive.
1—Gould Triplex Plunger—size 3" x 4"—25 gals. V Belt Drive.
1—Quimby Screw Type—size 2"—5 G.P.M.—50' head—motor drive.

ROTARY DRYER OR KILN

1—5' dia. x 40' long Horizontal Rotary Dryer, ⅜" shell, complete with tires, ring gear, rollers gearing, base plates.
Duriron Pipe and Fittings. Sizes 1", 2", 2½", flanged.

EMSCO EQUIPMENT COMPANY

Emil A. Schroth, Owner
49 HYATT AVE., NEWARK 5, N. J.
Phone Mitchell 2-3536

INDUSTRIES WE SERVE

Inks	Soaps
Paints	Drugs
Plastics	Liquors
Cosmetics	Food Products
Chemicals	Process Industries

REPRESENTATIVE OFFERINGS

Buffalo 6' Jack. Vacuum Crystallizer
Buffalo 3' Jack. Open Type Crystallizer
Cast Steel Autoclave 3" wall with agitator
Shriver 24" Plate and frame Filter Press —4 eye
Buffalo 5' x 6' Vac. Drum Dryer—Chrome Plated
Blaw-Knox 6' x 5' Stainless Steel Drum Dryer
Oliver 8' x 8' Continuous Filter

Kettle, Pumps, Tanks, Agitators, Conveyors, Labelers, Fillers, etc., all types.

Send for your copy of Bulletin A-2 describing desirable units available.

MACHINERY & EQUIPMENT (CORPORATION of N. Y.)
533 West Broadway, New York 12, N.Y.
GRamercy 5-6680

1 — Practically new Hardinge Conical Mill for sale.

Box 1885

VACUUM DRUM DRIER FOR SALE

We offer the following complete unit subject to prior sale: 1—48" x 40" Buffalo vacuum drum drier complete with Blackmer sanitary feed pump and double receiving chambers, 1—12" x 12" motor driven Devine vacuum pump, 1—15 h. p. Lincoln 440 volt, 3 phase, 60 cycle motor, 1—Devine surface condenser, 400 sq. ft. cooling surface, 1—lot 12" Gate valves and piping. This is a complete unit in A-1 condition set up for inspection. Price on request.

JOHN L. KELLOGG & CO.
South Elgin, Illinois Phone Elgin 5022

100—Box & Gondola Cars
100—8000 gal. R. R. Tank Cars
2—2000 to 4000-gal. Emulsion Colloid Mills
6-100-150 & 200 H.P. Diesel Units
343 KW 3/60/2300 F. M. Diesel
Raymond No. 0 Automatic Pulverizer
5' x 33' Steam Jacketed Vacuum Dryer
8—3 x 4 and 4 x 7 Hummer Screens
3 x 30, 3½ x 24, 5½ x 60, 6 x 40 and 6 x 59 Direct Heat Dryers
18 x 36 & 42 x 10 Acme Jaw Crushers
20-Ton Browning Loco Crane
24" Blast Furnace with movable curb for Lead, Tin and similar metals
20 H. P. Charlotte 1½ in. Colloid Mill
1 yd. P. & H. 50' Boom Cat. Crane

STORAGE TANKS
14—10,000, 15,000, 20,000 and 26,000-gal. Cap. Horizontal and Vertical

AIR COMPRESSORS
Electric—540, 676, 1,000 and 1,578 ft.
Diesel—360, 500, 700 and 1,000 ft.

R. C. STANHOPE, INC.
60 East 42nd St. New York, N. Y.

The Following Equipment Offered for
IMMEDIATE SALE!
Every Machine Rebuilt and Guaranteed!
Offered Subject Prior Sale!

IN STOCK . . . READY FOR IMMEDIATE DELIVERY!

Wire Collect for Prices and Details

SPECIAL — JUST RECEIVED
1—W. & P. 50 gallon capacity double arm heavy duty mixing machine.
1—Read 75 gal. cap. double arm mixing machine.
1—Pfaudler 250 gallon glass-lined jacketed mixing tank with motor.
Cast iron jacketed kettles, 30 gallon., 50 gal., 60 gal.
2—Kent 3-Roll 12x30 and 16x40 Horizontal Roller Mills, with water-cooled rollers.
1—J. H. Day 3-roll 16x40 Roller Mill, water cooled steel rollers, equipped with roller bearings and silent chain motor drive.

1—National Equipment Co. 6' Chaser with rolls measuring 28" in diameter x 16' wide.
1—U. S. Colloid Mill.
1—Werner & Pfleiderer 300 gallon, double arm Mixer.
1—Rockwell 150 gallon steam jacketed Mixer.
1—Paragon 250 gallon steam jacketed Mixer.
1—New Era 200 gallon double arm Mixer.
1—20 gal. capacity, pony mixer.
1—Schutz O'Neil Limited Pulverizer, 18" to 20"
1—Schutz O'Neil No. 3 Sifter.
World & Ermold rotary labeling machine.

Union Standard Equipment Company
318 Lafayette Street, New York 12, N. Y.

FOR SALE

Plastic Oven to heat 54" x 96" Plexiglass Sheets, with rails and trolleys. Complete with 3 phase motors. Bargain priced for quick sale. Prac. New.

R. L. YOUNG, 124 N. 3rd St., Phila. 6, Pa.
LOMbard 7434

AVAILABLE

1—60 gal. Copper Vacuum Still.
2—(New) 24 x 48" Vibrating Screens.
1—40" Tolhurst copper basket Centrifugal.
2—Mikro Pulverizers: 12" and 24".
2—#600 De Laval Clarifiers.
5—3-roll Mills: 16x40 and 12x30".
1—3-stage 75 hp. Centrifugal Pump.
2—4 x 6' Atmospheric Drum Dryers.
4—Lead-lined Tanks, 400 and 1000-gal.
2—Triangle Fillers, Gluers, Sealers.
3—Oliver Filters: 5x4' and 6x4'.
1—100 gal. W. & P. Jacketed Mixer.
1—3' Copper Vacuum Pan.
4—Water Stills: 10 and 25 GPH.
1—Howe 3500# Dormant Platform Scale.
1—10 gal. Bufflovac jac. Autoclave.

What equipment have you for sale?

LOEB EQUIPMENT SUPPLY CO.
920 North Marshfield Ave., Chicago 22, Ill.

FOR SALE!

5—18" to 42" Filter Presses.
1—3' x 2' Feinc Rotary Filter.
3—Oliver Rotary Filters, 5' x 8' to 8' x 10'
1—Atmospheric Truck Dryer with 19 Trucks.
3—W. & P. Mixers, 9, 20 and 150 gal.
1—Stokes 20 Shelf Vacuum Shelf Dryer.
10—Centrifugals, 32", 40", 48" baskets, belt and motor driven.
3—Sharples No. 6 Presurtite Centrifuges.
2—1200 gal. Steel, Jacketed, Closed Kettles
2—1750 gal. Lead Lined Pressure Tanks.
2—Scott 1250 gal. Jacketed Mixers.
1—Stokes 3' x 15' Rotary Vacuum Dryer.
Send for bulletins.

WANTED:
YOUR SURPLUS MACHINERY

BRILL Equipment Co.
225 WEST 34th STREET, NEW YORK 1, N.Y.

WANTED TO BUY

WANTED

Mikro Pulverisers, both large and small capacity. Send details and prices in first letter. Box 1988.

WANTED

3 or 5 Roller Steel Mills. Prefer High Speed Types. Box 1990.

WANT TO BUY

15—STEEL STORAGE TANKS — 10,000 Gal., 15,000 Gal., 20,000 & 25,000 Gal. Cap. Advise Inspection Location. E. J. Boyce, Pierce Bldg., St. Louis, Mo. *or* L. M. Stanhope, Wayne, Penna.

ITEMS WANTED

DISTRIBUTOR WITH LARGE VOLUME COVERAGE EAST OF MISSISSIPPI RIVER AMONG MAIL ORDER HOUSES, GROCERY, HARDWARE, DRUG JOBBERS, ETC., WOULD LIKE TO ADD ADDITIONAL PRODUCTS. PREFER CHEMICAL SPECIALTIES, such as insecticides, deodorants. Will consider others. Box 2011.

SELL NOW

For tax purposes or other reasons

WANTED

Complete plants or units
(Stock holdings or physical assets)
For continued operation, merger or liquidation
Box 2020

We wish to purchase part or all shareholdings of a manufacturing company in the chemical, color or allied field. We are a successful organization of 25 years standing, operating several medium-sized factory units and we are desirous of widening our sphere of interest. We prefer an organization where all or part of the management can be retained. Replies will be held strictly confidential. Box 2022.

Wanted—Surplus
RAW MATERIALS
Wastes—By-Products—Residues of All Kinds.
BOX No. 2014

BUSINESS OPPORTUNITIES

SWEDISH AGENCY FIRM well-connected with the Scandinavian Chemical Market wants to represent competitive houses. Reply to 'Excellent references' c/o Gumaelius Advertising Agency, Stockholm, Sweden.

PROPERTY FOR LEASE

Site suitable for manufacturing or assembly operations. Private spur tracks of Illinois Central, Louisiana & Arkansas and Cotton Belt.
10 Acres of land.
35,000 sq. ft. of building space.
5 room office.
300 h.p. steam generating and power plant ready for operation, on premises.
Ideal for transit operation.

—— o ——

Will consider
space lease or warehouse receipt storage.
Well located for distribution to Ark-La-Tex area. Within 5 minutes of financial district of downtown Shreveport.
Display space available.

—— o ——

JOHNSON & HELM
P. O. Box 541—Bossier City Sub-station,
SHREVEPORT, LA.

HELP WANTED

CHEMICAL ENGINEER WANTED

Excellent present and postwar opportunity for young man desiring permanent connection in production and control work with a growing midwest chemical manufacturer engaged 100% in essential industry. Previous experience valuable but not essential. Prefer man from midwest. Give details of education, experience, references, salary desired and other important particulars. Address Box No. 2006.

CHEMICAL MAN FOR EXPORT FIRM

Well-established export firm with substantial trade has opening for executive, experienced in chemicals, able to develop and handle a department. Export experience helpful but not absolutely necessary if proper chemical sales background. Salary plus participation in profits. Location away from New York. This is an exceptional offer. Submit complete details. All replies held strictly confidential. Box 2023.

CHEMICAL SALES

Old established internationally known chemical manufacturer in Middlewest has positions in several Middlewestern areas offering security and opportunity. Men with scientific degrees preferred and with some experience contacting industrial and drug accounts. Write Box 2012 for further information, giving age and background.

TECHNICAL MEN WANTED

We offer unusual opportunities in a new field of research for capable men.

PHYSICISTS, CHEMISTS AND ENGINEERS

are wanted for research on all phases of printing processes, including photomechanics, photography, paper, inks, etc. Write:

BATTELLE
MEMORIAL INSTITUTE
COLUMBUS 1, OHIO

Expanding Research Department of Manufacturer of packaging materials requires technical personnel. Positions open from section leaders to laboratory technicians. Work covers research as well as control and testing of many products, particularly synthetic resins. Location—attractive small community in Ohio. Please state qualifications, age, salary requirements and availability. Box 2024.

ASSISTANT PURCHASING AGENT, fully familiar pharmaceutical and allied chemicals, accustomed handling large volume details, production records, etc. State full particulars, age and salary expected.
Box 2018

Engineer or chemical engineer as assistant plant manager by progressive national food firm in New York City. Experience in air conditioning and dehydration preferred. Knowledge of solvent extraction helpful. Excellent opportunity for capable man.
Box 2016

CHEMISTS—CHEMICAL OR MECHANICAL ENGINEERS

ARE YOU PRODUCING SUCCESSFULLY BUT NOT ADVANCING FAST ENOUGH?

If so we have openings in our organization, an industrial chemical process industry.

Our company is an expanding chemical plant based on the Viscose process, with excellent post war possibilities.

The men needed should have production control and/or Design experience.

Location—Mid West

Age Preferred—30 to 40

Salary—Depending on Qualifications.

Our organization is acquainted with this advertisement.

Write giving complete personal and technical history to Box 2015.

Nationally known manufacturer of stills and autoclaves seeks salesmen calling on industrial plants and laboratories. Exclusive territory, attractive commissions. Write Chemical Industries, Box 2025.

Aggressive young technical men with unusual initiative and ability for product development or chemical process work in connection with industrial high vacuum. Chemical, mechanical, electrical, or physics background. New England and Florida locale.
NATIONAL RESEARCH CORP.
100 Brookline Avenue
Boston, Massachusetts

SITUATIONS WANTED

INDUSTRIAL CHEMIST & CONSULTANT
Available upon discharge from military service
B.S., M.S., Ph.D., LL.B.
Major, Chemical Warfare Service, Technical Division, Overseas.
20 years' experience in Research, Consulting and Patent Problems
Correspondence is invited.
Box 2019.

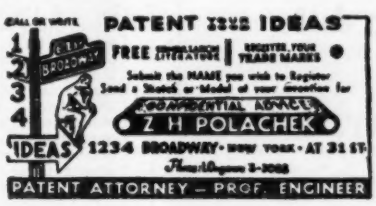
TECHNICAL SALESMAN

Pleasing personality—good mixer; anxious to apply sound technical background for analyzing customer problems and seeing they get the right product; 3 years research and development experience; age, 25; Draft exempt. Box 2021.

PROFESSIONAL DIRECTORY

RALPH L. EVANS ASSOCIATES
70 Chemists and Engineers
Fully Equipped
Laboratory and Pilot Plant
Organic and Inorganic Chemicals
Condensation Products
Continuous Processes
High Pressure
Raw Material Substitution
250 E. 43rd Street, New York 17, N. Y.
Tex. MUrray Hill 3-0072

PATENTS



ASSOCIATION OF CONSULTING CHEMISTS AND CHEMICAL ENGINEERS, INC.
50 East 41st Street
Room 82
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A Clearing House for Consultants
When in need of a consultant address the Association
No charge for this service.
The membership, located from coast to coast, comprises specialists in all fields.

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Analytical and Consulting Chemists
Phenol Coefficient Tests
Hormone Assays
PENICILLIN ASSAYS
Investigation, Control and Development of Pharmaceutical Products
211 East 19th St., N. Y. Gramercy 5-1030

DR. HENRY W. LOHSE
Research, Development and Surveys
Bulletin No. 10, Unit Processes
Syntheses Catalysis,
Copy free on request
67 Yonge St., Toronto, Ontario
Telephone: Elgin 4797

FOSTER D. SNELL, INC.
Our chemical, bacteriological, engineering and medical staff with completely equipped laboratories are prepared to render you Every Form of Chemical Service.
Ask for
"The Consulting Chemist and Your Business"
315 Washington Street Brooklyn 1, N. Y.

Personnel Notes

(Continued from page 1038)

DR. RALPH S. SWANN has been made director of research of American Mineral Spirits Co. He will be located at the main office in Chicago.

ROBERT J. TAYLOR has accepted an appointment as research associate in Southern Research Institute, where he will specialize in the chemistry of cellulose and related subjects.

P. M. HILLER, formerly sales and production manager for Jones Medical Laboratories, Inc., has been named general manager of the Great Lakes Laboratories, Cleveland, Ohio.

CHARLES WESTENBERG has resigned as assistant manager of Charles Tennant, Seres & Co. to become affiliated with the Millmaster Chemical Co.

DR. PAUL N. GROSS, head of the Duke University chemistry department, is the 1945 winner of the Herty Medal for tobacco research.

CHARLES H. BLESSING of the Alex. C. Fergusson Co., Philadelphia, has been made manager of the Allentown, Pa., branch.

Between the Lines

(Continued from page 980)

as the only plant using this cell for commercial production of metal at Lake Charles, La., was ordered suspended in March, 1944, after only a few months' operation.

Thermal Reduction Processes

In the thermal reduction methods certain reducing agents are used at high temperatures to reduce magnesium compounds to metallic magnesium. The carbothermal process was originally developed by Dr. Fritz Hansgirg, an Austrian, and takes its name from him. As used in this country, the Hansgirg process calls for heating coke and magnesium oxide to above 2,000 C. in a closed electric-arc furnace. Magnesium is liberated as a vapor. Reversal of the chemical reaction is partially checked by use of shock-cooling, passing the magnesium vapor through a stream of natural gas at a much lower temperature than the furnace atmosphere.

During shock-cooling the vapor is converted into solid form as magnesium dust. The fine powder, containing at this stage magnesium oxide and carbon, is mixed with oil to prevent combustion, then purified by distillation. The dough-like mixture resulting from addition of oil is known in the industry as "goop" and widely used as a charge for incendiary bombs.

The carbothermal process, however, is credited with yielding an exceptionally pure metal and a valuable byproduct in the mixture of magnesium oxide and carbon.

The ferrosilicon process calls for briquetting pulverized ferrosilicon and magnesium oxide, in the form of calcined dolomite, and charging in an extreme vacuum in small individual horizontal retorts, or into large vertical furnaces. The Pidgeon process, as it is also known, takes its name from its developer, Dr. L. M. Pidgeon. Experience with the ferrosilicon process is said to have been too scanty to indicate whether it is likely to be used after the war. It appears probable, says the Tariff Commission, that other methods of production will be found to be less costly.

Magnesium: U. S. Metal Production and Fabricated Product Shipments

The figures on fabricated products do not cover incendiary bomb body castings, extruded sheet stock and forging stock, and sticks.

Product	*Pounds (Thousands)* *January 1945*	*February 1945*	*% Change from January*
Metal production:			
Primary production	7,697	5,960	−22.6
Secondary recovery	2,508	2,116	−15.6
Product shipments:			
Castings:			
Sand	6,149	5,832	− 5.2
Permanent mold	609	658	+ 8.0
Die	247	217	−12.1
Wrought products:			
Forgings	16	14	−12.5
Extrusions	250	238	− 4.8
Sheet, strip and plate	194	208	+ 7.2

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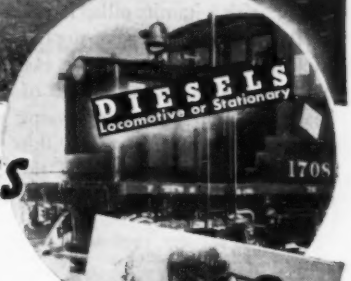

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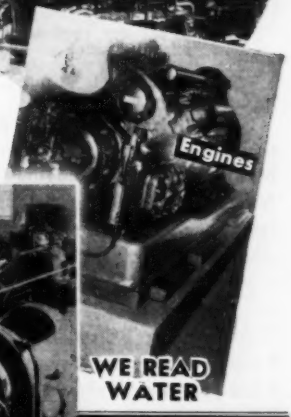

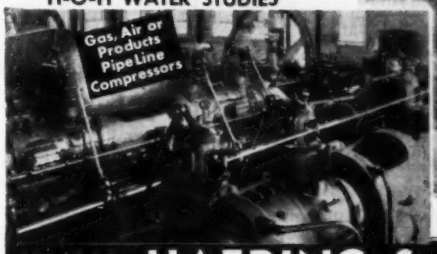

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"WE" – EDITORIALLY SPEAKING

BE CAREFUL what kind of pills you eat. Along with vitamin pills, liver pills, and all the rest, we now have sugar beet seeds packaged in plastic pills for easier planting. We shudder to think of what a beet seed, bursting with young vitality and feeling "an instinct within it that reaches and towers," would think about a few minutes after being swallowed.

SPEAKING OF PILLS, and we just were, they like almost everything else have been plugged by singing commercials. Now the Federal Reserve Bank of Cleveland is plugging fertilizers, for understandable business reasons, with a little to the tune of "Praise the Lord and Pass the Ammunition":

"Lime your soil, an aid to plant nutrition;
Lime your soil, and stop this soil attrition;
Lime your soil, it should be your ambition
To conserve our land."

This ballad, the author suggests, ought to be the standard introduction to all Grange meetings.

CHEMISTS have Superman vision. This at least, appears to be the fatuous belief of most of our paper-presenters who use lantern slides to elucidate their remarks. On one small slide they usually manage to crowd 14,667 separate pieces of information, in type so small that it would defy a Lilliputian to decipher it.

Let us imagine that there are 200 chemists in the audience. Let us further imagine that they are worth, on the average, $2 an hour. (Well, let's just assume that they get *paid* that much.) Then, even if only the 100 in the back rows can't see the slides, each minute of uncomprehension is worth, in the aggregate, $3.33. If the whole point of the 30-minute talk is lost on account of the inadequacy of the slides, 100 smackeroos have been thrown right out the window. Need we press it further?

A GOOD WORD for chemists to know is "serendipity." It was coined from Horace Walpole's story of the "Three Princes of Serendip" who were always having happy adventures through a combination of chance and sagacity.

Good chemistry is like that. It is the application of intelligent thought to lucky accidents—like Hyatt's invention of celluloid, or Goodyear's discovery of vulcanization. Neither lucky "breaks" nor earnest thought alone will upset the world very often; but the combination is powerfully serendipitous—or serendipous. Now *we've* coined a word!

TO THOSE, like us, who have forgotten all their Latin except *amo, amas, amat,* the news that English is supplanting the tongue of Cæsar in the U. S. Pharmacopœia should be welcome indeed. After six years (Rome wasn't built . . .) of discussion in the Committee of Revision, it was decided that the new issue would carry the English names of drugs first, followed by the Latin.

If we did not fear the accusation of being pedantic, we would be moved to remark that *per varios præceps casus rota volvitur ævi.*

JACQUES BARZUN, professor of history at Columbia University, has some important things to say about scientists in his book, *Teacher in America*: "If [our easygoing, rather credulous college boys and girls] leave college thinking, as they usually do, that science offers a full, accurate, and literal description of man and nature; if they think scientific research by itself yields final answers to social problems; . . . if they think theories spring from facts and that scientific authority at any time is infallible; if they think that the ability to write down symbols and read manometers is fair ground for superiority and pride; and if they think that science steadily and automatically makes for a better world—then they have wasted their time in the science lecture room . . . and they are a plain menace to the society they belong to."

LEAVE IT to the underworld to find snappy substitutes for such prosaic and stuffy nomenclature as barbiturates. These pills, which are giving the Narcotics Bureau a headache, are known familiarly as "goof balls," "yellow jackets," or "red birds," depending on the type of capsule used.

A MANUFACTURING CHEMIST advertises that "there is nothing better than ——— to clean and protect motor sludge. . . ." Thanks, no. Our sludge is doing all right without our dashing to its protection!

Fifteen Years Ago

From Our Files of May and June, 1930

Newport Co. and International Printing Ink Corp. announce plans for formation of Consolidated Chemical Corp. to consolidate the chemical and dyestuffs division of the Newport Co. with the International Printing Ink Corp.

Carbide & Carbon Chemicals Corp. begins full-time commercial operation of new synthetic alcohol plant at Charleston, W. Va.

American Cyanamid Co. announces acquisition of Wetterwald & Pfister Co., Wettersol Dyestuff Corp., and Dye Products & Chemical Co., and the consolidation of their businesses with that of the Calco Chemical Co., Inc. These companies have specialized in vat colors and form the nucleus for the vat color department of the Calco Company.

Guggenheim nitrate producing interests, supported by the Chilean Government, are understood to be the sponsors for a plan to reorganize the nitrate industry in that country, according to reports from Paris where details of the plan are being discussed. It is proposed to set up a holding company with a capital of £75,000,000, from which allotments will be made to participating nitrate producers, based upon the earning capacity.

National Oil Products completely reorganizes personnel, according to an announcement by Charles P. Gulick, president. The following department heads are named: G. D. Davis, O. E. Lohrke, Dr. C. I. Post, L. D. Grupelli, Leslie M. Brown and T. A. Printon.

George C. Lewis is re-elected president of the Chemist's Club of New York to May, 1933, to succeed himself. He is president of L. Martin Co., Darco Sales Co., and a director of Columbian Carbon.

Amos J. Beatty, president of the Petroleum Institute, presiding at the midyear meeting at Tulsa, June 2, states "crude oil production controls the general situation in the industry and it is still too high, although notable progress has been made in curtailment . . . daily average output of 2,000,000 barrels should be the limit at this time. This compares favorably with a daily average flow of 2,169,400 barrels for last week.

PART 2: PATENTS AND TRADEMARKS

Abstracts of U. S. Chemical Patents

A Complete Checklist Covering Chemical Products and Processes

Printed copies of patents are available from the Patent Office at 10 cents each. Address the Commissioner of Patents, Washington, D. C., for copies and for general information concerning patents or trade-marks.

From Official Gazette—Vol. 572, Nos. 3, 4—Vol. 573, Nos. 1, 2 (Mar. 20-Apr. 10) p. 580

*Metals, Alloys

Treating selenium coated element which comprises compressing element at elevated temperature with water. No. 2,370,493. Otto Saslaw, to Federal Telephone & Radio Corp.

Preparing conjugated diolefin which consists in passing mixture comprising alkene, water vapor and compound selected from selenium dioxide and selenium compounds through reaction zone maintained at dehydrogenation temperature. No. 2,370,512. James Amos and Frederick Soderquist to The Dow Chemical Co.

Production of ferro-alloy product for use as addition agent for incorporating alloying element in molten iron or steel. No. 2,370,608. Marvin Udy.

Manufacture of ferromanganese No. 2,370,610. Pierre Adeline to Thermoloys Ltd.

Apparatus for removing iron dissolved in water. No. 2,370,772. Herbert Bowers to The Permutit Co.

Welding flux for welding magnesium and magnesium base alloys rich in manganese comprising a salt flux of following compounds: LiCl, MgCls, KF, KCl. No. 2,370,935. Charles Bushrod to Magnesium Elektron Ltd.

Preparing ferrous wire for drawing which comprises passing wire through a salt bath consisting of potassium chloride, sodium chloride and sodium fluoride which leaves ferrous-oxidation inhibiting drag-out coating of said salts thereon, etc. No. 2,370,959. Artemas Holden.

Conditioning soldering iron of type provided with a tinned-copper soldering surface, which comprises: heating and fusing salt composition containing sodium hydroxide, potassium hydroxide and sodium cyanide. No. 2,370,960. Artemas Holden.

Coating wire with same or dissimilar metal by continuous electrolytic process. No. 2,370,973. William Lang.

Tin-plating bath carrying stannous salt in solution of acid selected from hydrofluoric and sulphuric acid, a sulfonated organic substance containing hydroxyl group, chosen from o-cyclo-hexylphenol, o-phenyl phenol, p-p'-isopropylidene bis-phenol and alphanaphthol, together with nicotine. No. 2,370,986. John Nachtman.

Loosening corrosion frozen metal-to-metal joint between normally cooperating movable members which comprises connecting each of members to terminal of source of direct current, placing joint in alkaline electrolyte, etc. No. 2,371,033. Zoltan Deshaw.

Producing metallic powders of magnesium and magnesium alloys which comprises passing stream of molten metal through porous nozzle impregnated with flux comprising magnesium chloride and thereafter disintegrating stream of metal by jet of atomizing gas. No. 2,371,105. Robert Lepsoe to The Consolidated Mining & Smelting Co. of Canada, Ltd.

Recovering precious metal from aqueous liquid containing metal in form of anions of complex acid, which comprises placing liquid in contact with solid organic anion removal material containing basic nitrogen group. No. 2,371,119. Frederick Nachod to The Permutit Co.

Electrodepositing nickel at cathode current density in excess of twenty amperes per square foot which comprises passing electric current from anode to cathode in aqueous bath containing nickel chloride. No. 2,371,123. Paul Amundsen to Parker-Wolverine Co.

Active material for negative lead storage battery plates comprising lead oxide in admixture with acid-insoluble and alkali-dispersible partially desulphonated lignin sulphonic acid compounds free from calcium and manganese compounds and from non-ligneous organic and inorganic impurities. No. 2,371,137. Joseph Orsino and Carlyle Harmon; said Orsino to National Lead Co., and said Harmon to Marathon Corp.

Structural normally corrodible metal coated with corrosion-preventive film of free dicarboxylic acid. No. 2,371,143. Emmett Barnum and Ernest Zublin to Shell Development Co.

Structure normally corrodible metal coated with corrosion-preventive film of a free dicarboxylic acid having 16 carbon atoms. No. 2,371,207. Ernest Zublin, Emmett Barnum and Ellis White to Shell Development Co.

Electric contact formed of alloy of beryllium, balance platinum. No. 2,371,239. Franz Hensel to P. R. Mallory & Co. Inc.

Electric contact formed of alloy of element selected from cadmium and zinc, silver and gold. No. 2,371,240. Franz Hensel, Kenneth Emmert, and James Wiggs to P. R. Mallory & Co. Inc.

Flotation reagent for concentration of barite ores, comprising talloel, lauric-acid-ester-diethylene glycol-ammonium sulphate and alcohol selected from hexanols, heptanols, octanols, monanols, decanols and dodecanols. No. 2,371,292. Edward Hoag.

Apparatus for removing carbonaceous deposits from metals and the like. No. 2,371,394. Donald Hunter and Carl Stine to Turco Products, Inc.

Removing electrodeposited coatings of metal selected from iron, cobalt, and nickel from surface of articles formed of magnesium and magnesium-base alloys, which comprises immersing article in solution consisting of water and hydrofluoric acid and mineral acid selected from nitric, sulfuric, hydrochloric, hydrobromic, and hydriodic acids and passing current through article. No. 2,371,529. William Loose to The Dow Chemical Co.

Magnesium base alloy containing 0.1 to 10 per cent of thorium, balance being magnesium. No. 2,371,531. John McDonald to The Dow Chemical Co.

*Medicinals

Synthesizing riboflavin by fermenting a sterile, lactose-containing lacteal material, by inoculation of material with Clostridium acetobutylicum and in presence of a salt of iron. No. 2,369,680. Reginald Meade and Henry Pollard and Nelson Rodgers to Western Condensing Co.

Nasal and aural preparation comprising fluid suspension of solid particles of sulfonamide of group consisting of sulfanilamide and substituted sulfanilamides having organic monosubstitution and a free hydrogen on the N1 nitrogen. No. 2,369,711. Rudolph Blythe to Smith, Kline & French Laboratories.

Producing concentrate high in vitamin B from fatty vitamin B source materials, which comprises defatting material by extraction with water-miscible fat solvent and extracting defatted material with aqueous solution of water-miscible fat solvent. No. 2,369,775. Howard Colman to National Oil Products Co.

Preparation of provitamins which comprises heating diester of 7-hydroxy sterol and organic monobasic carboxylic acid with liquid organic nitrile selected from benzonitrile, methyl cyanide, etc., and recovering therefrom 7-dehydro sterol compound. No. 2,369,918. Hans Rosenberg to E. I. du Pont de Nemours & Co.

Intermediate for synthesis of riboflavin and process for producing such intermediate; 1-tetraacylribitylamino-2-arylazo-4, 5-dimethyl benzene. No. 2,370,093. Max Tishler and John Wellman to Merck & Co. Inc.

Isolation of the lactogenic hormone, prolactin. No. 2,370,154. Gerhard Fleischer and Erwin Schwenk to Schering Corp.

Producing substances having high riboflavin content including step of ferementing aqueous ceral mash with Clostridium acetobutylicum in presence of sodium sulphite. No. 2,370,177. David Legg and Samuel Beesch to Publicker Commercial Alcohol Co.

Therapeutic product comprising active molecular structure of allantoin and a sulfa-compound selected from sulfanilamide, sulfapyridine, sulfathiazole, and sulfaguanidine. No. 2,370,561. Sebastian Mecca to Schuylkill Chemical Co.

Producing biotin inactivating material. No. 2,370,662. Roy Hertz and William Sebrell to the Government of the United States, as represented by the Administrator of the Federal Security Agency.

Sodium salt of meta xylyl dialpha-hydroxyphosphonous acid for pharmaceutical use. No. 2,370,903. Heinrich Hirschmann to Aktiengesellschaft vormals B. Siegfried.

Whooping cough endotoxin. No. 2,371,002. Lyon Strean to Ayerst, McKenna & Harrison (United States) Ltd.

1,3-dicyanoguanidine and preparation thereof. No. 2,371,100. Donald Kaiser and Jack Thurston to American Cyanamid Co.

Producing biguanide and alkyl substituted biguanides which includes subjecting corresponding copper biguanide sulfate in suspension in lower aliphatic monohydric alcohol to alkali metal sulfide and removing insolubles. No. 2,371,111. Russell Sperry and Edwin Hook to American Cyanamid Co.

P-substituted benzene sulphonamido pyridazine. No. 2,371,115. Philip Winnek and Richard Roblin, Jr. to American Cyanamid Co.

Therapeutic compound. No. 2,371,254. Simon Jone Nathan.

*Paints, Pigments

Coal paint comprising vegetable drying oil and coal of bituminous type having high grindability and capable of being broken into angularly shaped particles. No. 2,370,428. Albert Stillman to Fuel Research Corp.

Modified shellac product obtained by heating shellac with primary aliphatic polyamine in presence of a condensation catalyst. No. 2,371,212. Henry Bassford, Jr. and William Gardner.

Shellac product capable of yielding light-colored wax-free, flexible films from solution in aqueous media, resulting from reaction of dewaxed bleached shellac with a polyhydric alcohol in presence of a polyester which serves as mutual solvent for components. No. 2,371,235. William Gardner and Henry Bassford, Jr.

*Paper, Pulp

Super-calendered kraft paper skin coated with moisture-proof coating deposited from solvent, the kraft being plasticized to keep its moisture content up. No. 2,370,090. Herman Thies and Clarence Carson to Wingfoot Corp.

Paper coated with composition comprising alkali dispersion of clay and refined protein material treated with dithionite salt. No. 2,370,266. Allan Smith, Herbert Max and Donald Wheeler to Claude R. Wickard, as Secretary of Agriculture of the United States of America.

Preparing uniformly colored mineral coated paper web. No. 2,370,344. Harry Fisher to Consolidated Water Power & Paper Co.

Coated paper product comprising flexure-durable and tear-resistant paper stock, a surface primer, said primer being starch-bentonite composition. No. 2,371,266. Milton Schur to Reconstruction Finance Corp.

Heat sealable waxed wrapping sheet and process of manufacture. No. 2,371,314. Cecil Rhodes and Harold Wendorf to Rapinwax Paper Co.

*Petroleum Chemicals

Producing oxygenated organic compounds, which comprises subjecting gasoline comprising hydrocarbons of 5 to 7 carbon atoms, together with recycled gasoline, to oxidation in vapor phase at a superatmospheric pressure. No. 2,369,710. Joseph Bludworth Celanese Corp. of America.

Rapid and easily controlled method of chlorinating a petroleum fraction. No. 2,370,342. Carl Zellner of Tide Water Associated Oil Co.

Preventing discoloration of hydrocarbon materials during halogenation thereof in presence of moisture and iron or iron compounds, com-

* *Continued from Vol. 571, Nos. 3, 4; Vol. 572, Nos. 1, 2*

prising halogenating in presence of basic nitrogenous organic compound. No. 2,370,552. Bert Lincoln and Clarence Neilson to Continental Oil Co.

Liquid insulating composition comprising fluorinated derivative of mineral wax. No. 2,370,787. Peter Gaylor to Standard Oil Development Co.

*Petroleum Refining

Repeatedly using alkaline reagent for removing mercaptans from petroleum fluid comprising contacting reagent with free-oxygen-bearing gas in presence of oily distillate obtained from hardwood tar whereby to produce insoluble disulphide layer and regenerated reagent layer. No. 2,369,771. Donald Bond to The Pure Oil Co.

Increasing production of oil or gas well comprising introducing mixture of alkali metal naphthenate and naphthenic mineral oil fraction into well. No. 2,369,831. Philip Jones, and Marcellus Flaxman to Union Oil Co. of California.

Conversion of low boiling hydrocarbons into normally liquid hydrocarbons of higher antiknock value. No. 2,370,030. Arthur Goldsby to The Texas Co.

Isomerization of normal paraffins to form isoparaffins which comprises contacting with liquid catalyst consisting of water saturated with boron trifluoride. No. 2,370,118. William Axe to Phillips Petroleum Co.

Preparation of motor fuel. No. 2,370,144. Robert Burk to The Standard Oil Co.

Improved Diesel fuel comprising non-viscous hydrocarbon oil and to improve ignition quality of fuel, compound selected from group consisting of a nitrolic acid and a pseudonitrole. No. 2,370,183. Thomas Noland and Edwin Nygaard to Socony-Vacuum Oil Co., Inc.

Producing high quality lubricating oils from hydrocarbon oil containing wax constituents which on cooling precipitate in solid form. No. 2,370,297. Bruno Engel to Aktiebolaget Separator-Nobel.

Improving bonding power of asphalts which are incompatible with cationic bonding agents due to presence of impurities of water-soluble alkaline compounds and compounds forming water-soluble alkalies upon hydrolysis, comprising inactivating impurities and incorporating into asphalt an oil-soluble cationic bonding agent. No. 2,370,380. Alvin Anderson and Fred Stross to Shell Development Co.

Treating a well which comprises introducing aqueous solution of hydrochloric acid containing mixture of alkane-sulfonic acids of 6 carbon atoms consisting of primary and secondary acids and some chloroalkane sulfonic acids. No. 2,370,421. Cortes Reed to Charles Horn.

White refined paraffin wax product inhibited against formation of deleterious color upon prolonged exposure to light by addition of alkyl amide of oxygen acid of phosphorus. No. 2,371,289. Lyle Hamilton and Robert Moran and Albert Cattell to Socony-Vacuum Oil Co., Inc.

Treatment of hydrocarbon oils. No. 2,371,298. Thomas Hudson and James Turner to Phillips Petroleum Co.

Lubricant for internal combustion engines comprising mineral lubricating oil and, to inhibit oxidation of oil, benzyl dibutyl dithio carbamate. No. 2,371,319. William Ross, William Backoff and Norman Williams to The Pure Oil Co.

Compounded mineral lubricating oil for internal combustion engines containing dissolved to retard piston ring sticking, oil-soluble mono-carboxylic acid ester of alcohol selected from tri and tetra hydroxyl alcohols having a neo-carbon atom. No. 2,371,333. Fulton Johnston to Shell Development Co.

Separating aliphatic C4 olefin from a C4 hydrocarbon mixture containing same and other close-boiling more saturated C4 hydrocarbons. No. 2,371,342. Franklin Mayfield to Phillips Petroleum Co.

Converting crude oil into gasoline. No. 2,371,355. William Ross and Kenneth Boldt to The Pure Oil Co.

Production of high boiling normally liquid isoparaffins which comprises alkylating hydrocarbon mixture containing low boiling isoparaffin, low boiling normal paraffin, low boiling monoolefin. No. 2,371,402. George Mateer and Avery George to Standard Oil Development Co.

Hydrocarbon conversion. No. 2,371,538. Harrison Mayland to Universal Oil Products Co.

*Photographic Chemicals

Producing colored photographic image in gelatino-silver halide emulsion layer, which comprises exposing and developing it with primary aromatic amino developing agent in presence of phenol coupler. No. 2,369,929. Paul Vittum and Willard Peterson to Eastman Kodak Co.

Photographic strip film comprising permanent support having silver halide emulsion thereon and temporary support and containing as adhesive layer between supports the hydrolyzed colloid prepared by subjecting agar-agar high in nitrogen to hydrolysis. No. 2,370,321. Fritz Mueller.

Photographic process which comprises coating surface with light sensitive solution containing dextrine, glucose, glycerine, bichromate, water. No. 2,370,330. Kenneth Smith and Rudolph Zerbst to Scriver, Smith & Zerbst, Inc.

*Resins, Plastics

Preparing resinous material which consists in heating mixture of a monoglyceride product produced by esterification of glycerine and an oil acid selected from drying and semi-drying oil fatty acids with maleic anhydride and then adding oil selected from drying and semi-drying oils. No. 2,369,683. Charles Moore to The Glidden Co.

Vinyl resin compositions comprising (1) product of conjoint polymerization of vinyl halides and vinyl esters of lower aliphatic acids and (2) a methyl chlor stearate having 3 chlorine atoms in molecule. No. 2,369,985. Moyer Safford to General Electric Co.

Insulated conductor comprising electrical conductor, glass fibers in form of sliver wrapped about conductor, and a resinous composition applied to electrical conductor, resinous composition composed of oil-modified alkyd resin, phenol-formaldehyde and hydrolyzed polyvinyl ester. No. 2,370,046. John Keyes to Westinghouse Electric & Mfg. Co.

Composition for finishing and dressing fibrous materials, comprising aqueous emulsion containing tough, dry, elastic and rubbery polyisobutylene, a cyclic hydrocarbon resin selected from resinous polymers of beta-pinene and hydrogenated coumarone indene resins, and methyl cellulose. No. 2,370,057. Gerry Mack to Advance Solvents & Chemical Corp.

Producing articles of polymeric vinyl acetal which consists in forming article of solid polyvinyl alcohol, pre-treating formed article with catalyst, and then reacting article in a reaction bath containing monomeric acetal to produce polyvinyl acetal. No. 2,370,126. Joseph Dahle to Pro-phy-lac-tic Brush Co.

Plastic composition comprising intimate solid dispersion of aluminum hydrate with conjoint polymer of vinyl chloride with vinyl acetate. No. 2,370,280. Victor Yngve to Carbide & Carbon Chemicals Corp.

Preparing coated resin product which comprises polymerizing organic oxygen compound which contains polymerizable groups to form polymerizable gel, coating surfaces of gel with polymerizable organic oxygen compound. No. 2,370,562. Vincent Meunier to Pittsburgh Plate Glass Co.

Polymerized ester of polyglycol and acid ester of unsaturated alcohol and carbonic acid in which both hydroxy groups of polyglycol are esterified with acid ester. No. 2,370,565. Irving Muskat and Franklin Strain to Pittsburgh Plate Glass Co.

Polymer of diester of carbonic acid and lactic acid ester of unsaturated alcohol. No. 2,370,566. Irving Muskat and Franklin Strain to Pittsburgh Plate Glass Co.

Preparing polymer of an ester containing two polymerizable aliphatic monovalent radicals. No. 2,370,578. Maxwell Pollack and Irving Muskat and Franklin Strain to Pittsburgh Plate Glass Co.

Producing plastic material from keratin. No. 2,370,669. Curt Joseph to Pilkington Bros., Ltd.

Resinous copolymer consisting of product resulting from copolymerization of terpene hydrocarbon having empirical formula $C_{10}H_{16}$ and material selected from acyclic unsaturated monobasic fatty acids of 12 to 22 carbon atoms and glyceryl esters thereof. No. 2,370,688. Alfred Rummelsburg to Hercules Powder Co.

Copolymer of acyclic terpene having three double bonds per molecule and material selected from acyclic unsaturated monobasic fatty acids of 12 to 22 carbon atoms and mono and polyhydric alcohol esters thereof. No. 2,370,689. Alfred Rummelsburg to Hercules Powder Co.

Extruding fused thermoplastic compositions. No. 2,370,721. Henry Dreyfus to Celanese Corp. of America.

Organic-silicon polymers and method of making them. No. 2,371,050. James Hyde to Corning Glass Works.

Viscous resinous product of reaction of polyhydric alcohol, rosin or hydrogenated rosin, and member of polyvinyl esters of saturated organic acids and partial polyvinyl acetals. No. 2,371,065. Paul Powers to Armstrong Cork Co.

Effecting condensation of organo-silicol selected from alkyl, aralkyl, alkylaryl, aroxyaryl and halogenated and non-halogenated aryl and alkaryl silicols. No. 2,371,068. Eugene Rochow to General Electric Co.

Making synthetic fibers which comprises bringing surface of preshaped solid piece of synthetic polymerized thermoplastic material into contact with heating member, depositing as film upon said heating member quantity of material melted off said piece and drawing great number of simultaneously forming fibers from said film of molten material by moving apart said piece and heating member. No. 2,371,075. Maurice Spertus to Spertus Processes, Inc.

Rubber-like plastic mass comprising rubber-like product of polymerization of 1,3-butadiene with polymerizable material comprising acrylonitrile mixed with mixed ester. No. 2,371,098. Arnold Davis to American Cyanamid Co.

Plastic composition comprsing polyvinyl acetal resin and, as modifying agent therefor, benzyl ether of diethylene glycol monopropionate. No. 2,371,131. Elmer Derby to Monsanto Chemical Co.

Polymer made from monomeric material consisting of vinyl chloride, and an alkyl aryl ketone. No. 2,371,134. Thomas Gresham to The B. F. Goodrich Co.

Producing plastic article which comprises forming suspension of fibres in liquid, distributing a resin through suspension so that resin adheres to fibres in solid form, forming porous sheets. No. 2,371,313. William Rast and David Musser to The Glenn L. Martin Co.

Preparing sheets of plastic material possessing pearlescent appearance which comprises forming sheets of plastic material containing light reflecting lamellar particles, etc. No. 2,371,349. Edward Norton to Monsanto Chemical Co.

Polymerizing vinyl aromatic compound in presence of dicyclopentadiene whereby polymer is formed of low molecular weight. No. 2,371,499. Edgar Britton and Walter LeFevre to The Dow Chemical Co.

*Rubber

Quick setting tacky cement comprising purified latex, curing agent, sensitizing agent, and volatile stabilizer, sensitizing agent being ammonium nitrate and stabilizer being dimethylamine. No. 2,370,044. Kenneth Keene and Ernest Bargmeyer to Mishawaka Rubber & Woolen Manufacturing Co.

Making a rubber product, the steps of fat-liquoring chrome-tanned leather shavings to acetone-extractable content, dry milling dried shavings, and incorporating resultant filler in rubber. No. 2,370,457. William Gocher and Alfred Jennings and Carl Langkammerer to E. I. du Pont de Nemours & Co.

Rubber having incorporated mixture containing member of group consisting of N,N8-diphenylbenzidine and C-substituted N,N-diphenylbenzidine and different secondary aromatic amine devoid of strongly negative groups. No. 2,370,987. Arthur Neal and John Vincent to E. I. du Pont de Nemours & Co.

Producing expanded rubber chloride product. No. 2,371,382. George Cuthbertson to United States Rubber Co.

Preserving latex and the product thereof. No. 2,371,544. Chester Rhines to United States Rubber Co.

Concentrating latex which comprises adding to normal latex alkali metal soap and acid -sulphuric ester of octodecyl-lactate. No. 2,371,560. Godfried Johan van der Bie.

*Textiles

Manufacture of fabrics and like with beaded or similar decoration which comprises applying to surface a setting possessing throughway to surface, filling throughways of setting with a viscous liquid comprising hardenable resinous composition. No. 2,370,028. Henry Freiberg, one-half to Samuel Freiberg.

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Textile material comprising yarns having tapered synthetic fibers with their directions of taper opposed heterogeneously. No. 2,370,112. Joseph Truitt to American Viscose Corp.

Cyclic system for manufacture of cuproammonium rayon and for recovery of chemicals. No. 2,370,156. William Furness to American Rayon Co., Inc.

Producing laundry-resistant finish on cloth which comprises impregnating with emulsion of oil-in-water type in which continuous phase is aqueous solution of emulsifying agent and dispersed phase contains mixture of phthalic glyceride resin and melamine-formaldehyde resin. No. 2,370,362. Donald Light to American Cyanamid Co.

Making multi-ply stiffened fabric, characterized by permeability to air and moisture, by pleasing handle and appearance and by resistance to wear after repeated laundering. No. 2,370,550. Alfred Lawrence and Shailer Bass to The Dow Chemical Co.

Preparing light sensitive material stencil screen with synthetic mesh fabric of type which will stretch when moistened. No. 2,370,874. Harry Playford to The Liberty Glass Co.

Bandage which on contact with skin is non-adherent to skin but is cohesive when wound upon itself, comprising strip of gauze cloth having coating on both sides of unsaturated solid solution of a polyvinyl acetate in a solvent plasticizer. No. 2,371,001. Raymond Stone.

Improving fastness to acid fumes of colorations on organic derivative of cellulose textile materials dyed with water-insoluble anthraquinone dyes of dispersal type, which comprises forming water-insoluble tannic acid salt of metal on said colored organic derivative of cellulose textile material. No. 2,371,221. Robert Burns to Celanese Corp. of America.

Production of viscose rayons which comprises extracting cotton cellulose, prior to alkalization, with solution of nitric acid to extract cutin-like component of the material. No. 2,371,233. Wanda Farr to The Chemical Foundation, Inc.

Production of ramie yarn for preparing woven articles, which consists in repeatedly subjecting ramie fibres to alkali boiling, pressing, and washing to effect degumming. No. 2,371,573. Mark Sabner.

Water, Sewage, & Sanitation

Simultaneously effecting instantaneous sterilization of air laden with bacteria or other pathogenic organisms and controlling relative humidity of air, comprising bringing air into contact with mixture of glycol and water in vapor form. No. 2,369,900. Burgess Jennings and Edward Bigg to the Government of the United States of America, as represented by the Secretary of War.

Water softener. No. 2,370,190. Glenn Ralston to Servisoft, Inc.

Treating domestic washing waters for bathing, laundering, dish-washing, which comprises adding water-soluble glass, consisting of complex which is homogeneous fusion product consisting of normal oxides of sodium, magnesium and phosphorus. No. 2,370,473. Charles King to Blockson Chemical Co.

Controlling insects having water-dwelling life phase comprising applying to water bodies wherein they may develop a hydrocarbon oil of highly cyclic nature. No. 2,370,881. Theodore Roehner to Socony-Vacuum Oil Co. Inc.

Subjecting raw, untreated sewage to primary treatment in a single treating unit. No. 2,370,974. Lawrence Langdon to Pacific Flush Tank Co.

Sanitary medium for person seated on chair, comprising sheet of absorbent material impregnated with disease-controlling agent and adapted to be interposed between chair seat and body of person. No. 2,371,390. Arno Graue.

Water conditioner. No. 2,371,444. Horace Grayson Hubert.

Agricultural Chemicals

Blanching vegetable material which comprises placing such material in a blanching zone within an enclosed chamber, etc. No. 2,373,521. Arthur Wigelsworth to Anabolic Food Products, Inc.

Recovering glumatic acid from thin Steffen's waste liquor. No. 2,373,342. Celestian Royal to International Minerals & Chemical Corp.

Making modified cornstarch. No. 2,373,016. Raymond Daly and Frederick Frankenfield and Herman Schopmeyer to American Maize-Products Co.

Refining sugar syrups or melts, which comprises subjecting sugar melt to purifying action of bone char, and then treating partially purified sugar melt with powdered activated carbon admixed with finely-granular petroleum coke. No. 2,372,996. Leonard Wickenden.

Producing yeast and alcohol which comprises subjecting saccharine material to alcoholic fermentation with yeast, and subjecting yeast to refermentation in presence of grain substance and hops. No. 2,372,854. Gustave Reich.

Adhesive starch composition in which a proportion is in enzyme converted form and in which lesser proportion is in ungelatinized form with a basic metal chloride pasting inhibitor, said inhibitor consisting of sodium chloride, potassium chloride, calcium chloride, zinc chloride or magnesium chloride. No. 2,372,666. James Fenn to Stein, Hall & Co. Inc.

Substance promoting growth of yeast and other unicellular plants, depantothenic aldehyde-diethyl-acetal. No. 2,372,654. Franz Bergel, Alexander Morrison, Nathan Hindley and Albert Moss to Roche Products Ltd.

Livestock feed mixture for self-feeding, comprising a highly palatable protein supplement, a mineral mixture, and calcium chloride. No. 2,372,476. Wallace Elmslie to Moorman Manufacturing Co.

Separation of fatty acid component from tall oil, which comprise heating tall oil and a phenol in presence of aromatic sulfonic acid to form a phenol condensate with resin acid component. No. 2,372,446. Arthur Osterhof to Hercules Powder Co.

Filter medium comprising mixture of short, thin, purified alpha-cellulose fibers prepared from agricultural residues, and long, purified cellulosic fibers. No. 2,372,437. Elbert Lathrop and Samuel Aronovsky to Claude R. Wickard, Secretary of Agriculture, U. S. A.

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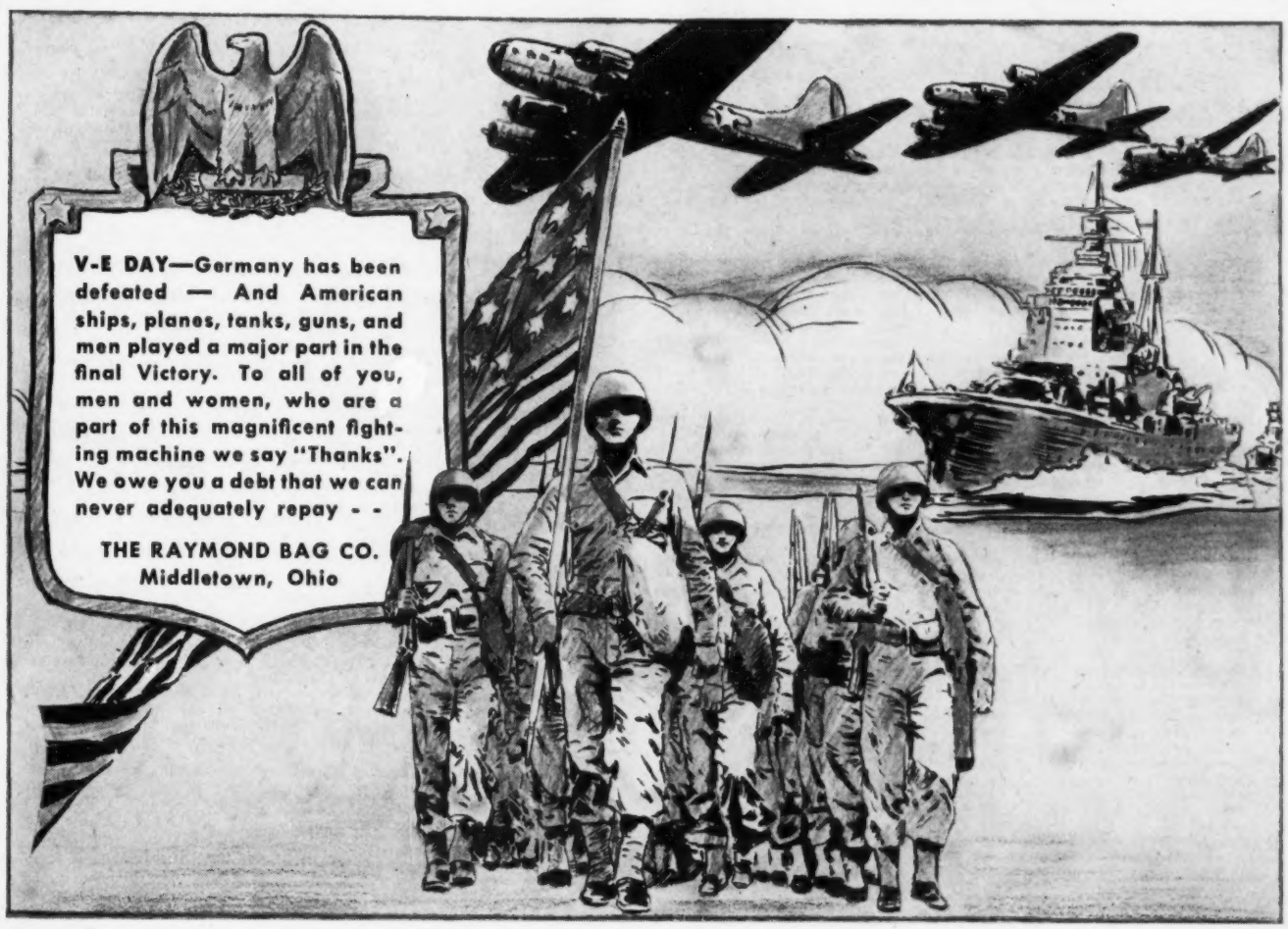
V-E DAY—Germany has been defeated — And American ships, planes, tanks, guns, and men played a major part in the final Victory. To all of you, men and women, who are a part of this magnificent fighting machine we say "Thanks". We owe you a debt that we can never adequately repay - -
THE RAYMOND BAG CO.
Middletown, Ohio

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Production of colloidal solution of starch which comprises gelatinizing starch in mixture of water and heterocyclic tertiary introgenous base and eliminating water from mixture by distillation. No. 2,372,337. Eugene Pacsu and James Mullen to Research Corp.

Separating pyrethrins from solution of impure pyrethrum extract in a petroleum hydrocarbon solvent. No. 2,372,183. William Barthel and Herbert Haller to the United States of America as represented by Claude R. Wickard, Secretary of Agriculture.

Treating fish water by evaporation to increase concentration thereof and maintain solubility of constituents thereof comprising: adding, an acidic phosphatic compound to maintain pH of water in acid range during evaporation. No. 2,371,812. Robert Ernst to Louisville Drying Machinery Co.

Cellulose

Unwoven carded cotton cellulosic fibrous material impregnated with alkali soluble alkyl hydroxy cellulose. No. 2,372,713. Joseph Curado and August Finalborgo to General Printing Ink Corp.

Ceramics

Cyclic process of preparing magnesia in a form for use in manufacturing molded magnesium carbonate products. No. 2,373,528. Thomas Atchison to Johns-Manville Corp.

Separation of magnesite from mixture of serpentine and magnesite with impurities, including talc, anthophyllite, and primary chromite. No. 2,373,123. John Lefforge.

Obtaining alumina from an aluminous siliceous material. No. 2,372,819. Elbert Fisher to Marlew Fisher.

Shaping and finishing curved glass surface comprising subjecting said surface to rubbing against curved rubber mat with aqueous hydrofluoric acid bath therebetween. No. 2,372,535. Victor Walker to AlnCin, Inc.

Dry solid refractory composition containing refractory aggregate, a halide of low hygroscopicity, a non-hygroscopic acid salt, and a non-hygroscopic substance taken from magnesia and metal oxide and non-metal oxide derivatives of zirconium oxide. No. 2,372,236. Eugene Wainer to The Titanium Alloy Manufacturing Co.

Controlling development of gas pores in production of cellular cementitious bodies. No. 2,371,928. Josef Schneider.

Removing waste products from etching glass with hydrofluoric acid that comprises treating glass with a bath including hydrochloric and nitric acids. No. 2,371,758. Lester Hicks to Eastman Kodak Co.

Chemical Specialties

Separating particles of a heavy material having known specific gravity from an unwashed, unsized mixture containing light particles of lesser specific gravity. No. 2,373,635. Charles Wuensch to Minerals Beneficiation, Inc.

Pressure sensitive adhesive tape comprising flexible backing sheet of creped paper coated with pressure-sensitive continuous flexible coating composition containing microcrystalline wax and paraffin wax. No. 2,373,634. Charley Wagner to Marathon Corp.

Making aqueous solution of a wetting agent which comprises mixing alkaline solution of high molecular weight alkali-hydrolysis product of a protein with an alkaryl sulfonyl chloride. No. 2,373,603. John Rust and Leonard Spialter to Montclair Research Corp.

Making solution of a surface active agent which comprises mixing alkaline solution of high molecular weight alkali-hydrolysis product of a protein with an alkyl sulfonyl chloride. No. 2,373,602. John Rust and Leonard Spialter to Montclair Research Corp.

Adhesive for waxed paper comprising free-flowing liquid composition having aqueous continuous phase and containing aqueous dispersion of rubber and corn syrup. No. 2,373,597. James Purdon to The B. F. Goodrich Co.

Preparing soap in cake form. No. 2,373,593. Fred Pease to Lever Brothers Co.

Perfume material consisting of reaction product of acetone with compound formed through Diels-Alder mechanism by heating methacrolein with a conjugated diene selected from 4-methylpentadrene-1,3 and cyclopentadiene. No. 2,373,568. Homer Joy and John Rust to Lyndhurst Chemical Corp.

Making flame-coloring articles comprising impregnating combustible pine cone with water-soluble combustion-retarding agent which inhibits burning of said combustible material and water-soluble flame-coloring agent comprising a metallic salt having a cation which produces a coloration to a flame. No. 2,373,512. Herbert Palmer Starner.

Gasket material comprising oil-resistant elastic sulfur-vulcanizable synthetic rubbery material from 2,chlorobutadiene 1,3 polymer and a butadiene acrylonitrile copolymer; asbestos and comminuted mineral wool; and vulcanizers and modifying agents. No. 2,373,461. Donald Crampton to Felt Products Manufacturing Co.

Hand soap comprising a water-soluble soap and bagasse ashes. No. 2,373,460. Jeronimo Diaz Compain.

Production of basic tin soap compositions comprising reacting moist stannous hydroxide, $Sn(OH)_2 \cdot H_2O$, whose elemental tin content is from 25% to 60%, with a monocarboxylic acid. No. 2,373,387. Stanley Elliott to The Harshaw Chemical Co.

Anti-knock motor fuel comprising gasoline and symmetrical di methyl diphenyl urea. No. 2,373,372. George Banks.

Preventing contamination by circulation fluid of core samples taken from bore holes which includes placing on bottom of well a fusible alloy. No. 2,373,323. George Macready.

Adhesive composition comprising rubber chloride and 1,3-dichlor 5,5-dimethyl hydantoin. No. 2,373,308. Corydon Grafton to United States Rubber Co.

Concentrating tungstate minerals from ores containing carbonate and silicon-bearing gangue by means of froth flotation, which comprises carrying out flotation in presence of reagent combination of an anionic promoter, selected from higher aliphatic fatty acids, talloel, and sodium, potassium and ammonium soaps thereof, an alkali salt of a dialkyl sulfosuccinate and a gangue depressant selected from citric acid, tannic acid and quebracho. No. 2,373,305. Elmer Gieseke to American Cyanamid Co.

Improved mineral oil composition comprising viscous mineral oil fraction and in admixture therewith reaction product obtained by reacting phosphorus pentahalide with aromatic hydroxycarboxylic acid. No. 2,373,286. Darwin Badertscher, Robert Williams and Henry Berger to Socony-Vacuum Oil Co.

Hermetically sealed envelope comprising rectangular sheet of metal foil provided with film of rubber hydrochloride secured to one face. No. 2,373,285. Carl Baer.

Breaking petroleum emulsions of water-in-oil type, which consists in subjecting emulsion to demulsifier comprising a monocarboxy acid ester. No. 2,373,174. Melvin DeGroote and Bernhard Keiser to Petrolite Corp. Ltd.

Breaking petroleum emulsions of water-in-oil type, which consists in subjecting emulsion to demulsifier, comprising a sub-resinous acidylated derivative of an acylated substituted urea. No. 2,373,102. Melvin DeGroote and Bernhard Keiser to Petrolite Corp. Ltd.

Improved mineral oil composition comprising viscous mineral oil fraction having in admixture phosphorus and sulfur-containing reaction product obtained by reaction of phosphorus pentasulfide and a thermal recycle stock and compound selected from phenol substituted with long-chain alkyl group and an alcohol having long-chain alkyl group. No. 2,373,094. Henry Berger, Thomas Noland and Everett Fuller to Socony-Vacuum Oil Co. Inc.

Fuel for compression-ignition engines of Diesel type which comprises a hydrocarbon Diesel fuel and a sulfur-containing ignition promoter consisting of hexasulfamide. No. 2,373,044. Pharis Miller and Gould Cloud to Standard Oil Development Co.

Smooth surface fibrous article that consists of an unwoven mat of fiber of raw commercial sisal and resinous bonding material. No. 2,373,033. Karl Kopplin to F. Burkart Manufacturing Co.

Composition for treatment of fibrous materials which consists of cation-active material and phosphatide. No. 2,372,985. Murray Roth to The Richards Chemical Works.

Mineral lubricating oil for internal combustion engines, containing dissolved a carbon softening amount of an oil-soluble alkali metal salt of a phthalic acid mono alkyl ester. No. 2,372,955. Fulton Johnston to Shell Development Co.

Preparation of stable aqueous emulsions of bituminous material such as road tar, pitch and bitumen for use on roads. No. 2,372,924. Edwin Arnold to Woodall-Duckham Ltd.

Base presenting luminescent materials of relatively greater and lesser afterglow on surface. No. 2,372,903. John Lynch to E. P. Lynch, Inc.

Producing cleaning composition in form of a rigid porous dry compressed mass to be held in hand and rubbed over surface to be cleaned, comprising combining finely divided magnesite, finely divided clay, magnesium chloride water solution, introducing into mineral binder, wood excelsior. No. 2,372,838. Daniel Luse.

Electrical conducting composition consisting of solid solution of highly ionizable salts, in normally solid polyhydroxylic organic material in which salts are ionized. No. 2,372,829. William Holst to Atlas Powder Co.

Absorption base consisting of oleaginous material; and emulsifier incorporated therewith consisting of mannide monoester of fatty acid and other esters, produced in anhydridization-esterification reaction of mannitol with said acid. No. 2,372,807. Kenneth Brown to Atlas Powder Co.

Self-lubricating semi-metallic packing, comprising extruded elongated body composed of a plurality of interlocked pellets of lubricant-coated soft metal. No. 2,372,773. John Fiechter.

Emulsion product, the dispersed phase of which comprises water and dispersion medium incorporates soap-free fatty oil, emulsion containing methyl cellulose. No. 2,372,756. Laszlo Auer and Arthur Ray to Ridbo Laboratories, Inc.

Joining materials in mass production which consists in applying mixture of heat-hardening glue and cold-setting glue. No. 2,372,738. Reginald Powell to Timm Aircraft Corp.

Bituminous emulsion comprising bitumen, water, an alkaline aqueous phase, and a stabilizer consisting of homogeneous non-coagulable liquid blood formed by homogenization of undefibrinized coagulated blood. No. 2,372,658. Walter Buckley and Edwin Bly to American Bitumuls Co.

Breaking aqueous emulsions of liquid nitro aromatic compounds of benzene series which comprises adding to emulsions a water soluble salt of sulfuric acid ester of normal primary alcohol. No. 2,372,623. Daniel Zinner to E. I. du Pont de Nemours & Co.

Sludge retarding mineral oil composition containing dissolved an oil-soluble metal salt of a monocarboxylic acid of a heterocyclic aromatic compound. No. 2,372,588. Robert Larsen and Ernest Zublin to Shell Development Co.

Fluxes for treatment of light metals in which with fluoride selected from alkali and alkaline earth metal fluorides, and calcium chloride, and magnesium chloride, there is alkali metal chloride. No. 2,372,563. Edward Emley to Magnesium Elektron Ltd.

Production of lubricant comprising chlorinating petroleum fraction containing aliphatic compounds by treating such fraction with chlorine, etc. No. 2,372,414. John Werder to The Lubri-Zol Development Corp.

Non-corrosive lubricating composition comprising mineral oil and dissolved therein oil-soluble polyvalent metal salt of a sulfonic acid and normally corrosive polyvalent metal salt of an aromatic hydroxy compound. No. 2,372,411. Paul Van Ess and Roland Bergstrom to Shell Development Co.

Packaging material in powdered form for ready solution in a liquid. No. 2,372,406. Joseph Treneer to Miles Laboratories, Inc.

Crystalline compound belonging to carbonates, bicarbonates, tartrates and phosphates having interstitial coating containing a saturated fatty acid and a polyhydroxy compound. No. 2,372,402. William Stokes and William Barch to Standard Brands, Inc.

Hectograph blanket in form of a roll, comprising copy mass, bonding layer, backing. No. 2,372,355. William Champion to Ditto, Inc.

Hectograph blanket comprising tannable gelatinous copy mass, fibrous backing and intermediate bonding layer comprising drying oil, said fibrous backing being coated with a lacquer containing liquid selected from polyhydric alcohols and incompletely esterified polyhydric alcohols. No. 2,372,354. Robert Bour to Ditto, Inc.

Breaking petroleum emulsions of water-in-oil type, characterized by subjecting emulsion to demulsifier comprising an oxyalkylated derivative of a sub-rubbery polymeric sulfur-converted polyhydric alcohol ester. No. 2,372,259. Melvin DeGroote and Bernhard Keiser to Petrolite Corp. Ltd.

Breaking petroleum emulsions of water-in-oil type, which consists in subjecting emulsion to demulsifier comprising an aryl polyglycol sulfonate. No. 2,372,258. Melvin DeGroote and Bernhard Keiser to Petrolite Corp. Ltd.

Breaking petroleum emulsions of water-in-oil type, which consists in subjecting emulsion to demulsifier comprising urea pyridinium compound. No. 2,372,257. Melvin DeGroote and Bernhard Keiser to Petrolite Corp. Ltd.

Breaking petroleum emulsions of water-in-oil type, which consists in subjecting emulsion to demulsified comprising a diaryl substituted methane

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sulfonate, in which aryl radicals are monocyclic and sulfonic acid radical is nuclearly linked. No. 2,372,256. Melvin DeGroote and Bernhard Keiser to Petrolite Corp. Ltd.

Breaking petroleum emulsions of water-in-oil type, which consists in subjecting emulsion to demulsifier comprising a diaryl substituted methane sulfonate. No. 2,372,255. Melvin DeGroote and Bernhard Keiser to Petrolite Corp. Ltd.

Breaking petroleum emulsions of water-in-oil type, which consists in subjecting emulsion to demulsifier comprising a sub-resinous esterification product. No. 2,372,254. Melvin DeGroote and Bernhard Keiser to Petrolite Corp. Ltd.

Producing pulverulent building composition which remains in non-coalescent state comprising pulverulent inert filler and binder of soluble and fusible bitumens, the thermoplastic resins, and the drying fatty oils. No. 2,372,230. Albert Sommer.

Anti-dimming preparation comprising: a nonaethylene glycol mono ester of a fatty acid selected from lauric, stearic, oleic and palmitic acids; and an ethylene glycol ester of a fatty acid selected from same acids. No. 2,372,171. Harry Bennett.

Stable emulsion of a lipophilic substance in aqueous phase which includes pectin of type which consists principally of pectinic acid partially neutralized and free from alkaline earth metals and a cation-active emulsifying agent. No. 2,372,159. Lessel Manchey and George Schneller to Vick Chemical Co.

Lubricated rope including flexible longitudinally extending element comprising plastic material, and particles of lubricant embedded in surface portion of element. No. 2,372,142. Richard Warren, Jr.

Drilling fluid comprising saturated aqueous solution of calcium chloride, a cement, and a starch in pasted form. No. 2,371,955. Reginald Dawson and Charles Blankenhorn to Shell Development Co.

Insulating material for heat or sound or both, consisting of threads of glass, of short and substantially uniform length. No. 2,371,880. Andre Laurent Delloye.

Removing hair and wool from hides and skins, which comprises subjecting hides to action of aqueous alkaline medium containing lime, alkali sulfide and a substance selected from salts of cyanic and thiocyanic acids, cyanuric and isocyanuric acids and amides, of cyanuric acid. No. 2,371,875. Edward Christopher to Industrial Patents Corp.

Adhesive composition comprising admixture of a potentially reactive resinous reaction product of mixture consisting of cashew nut shell oil and another phenol, with solubilized depolymerized vulcanized rubber, and a hardening agent for said resin. No. 2,371,870. Charles Brown and George Hulse to United States Rubber Co.

Lubricant for metal surfaces capable of preventing corrosion, comprising petroleum lubricant containing in solution, neutral addition product of primary fatty amines containing from 8 to 18 carbon atoms and acid phosphate di-esters of tri-alkylated phenols. No. 2,371,854. Herschel Smith and Troy Cantrell to Gulf Oil Corp.

Lubricant for metal surfaces capable of preventing corrosion, comprising petroleum lubricant containing in solution, neutral addition products of di-cyclohexyl amine and acid phosphate di-esters of trialkylated phenols. No. 2,371,853. Herschel Smith and Troy Cantrell to Gulf Oil Corp.

Lubricant for metal surfaces capable of preventing corrosion, comprising petroleum lubricant containing in solution neutral addition product of 3-methyl-butyl, 2-ethyl-hexyl acid phosphate and di-cyclohexyl amine. No. 2,371,852. Herschel Smith and Troy Cantrell to Gulf Oil Corp.

Lubricant for metal surfaces capable of preventing corrosion in presence of moisture and air, comprising petroleum lubricant containing in solution, neutral addition product of 3-methyl-butyl, 2-ethyl-hexyl acid phosphate and a primary fatty amine. No. 2,371,851. Herschel Smith and Troy Cantrell to Gulf Oil Corp.

Forming abrasive and polishing compound comprising evaporating abrasive-forming material in close proximity to surface of transparent body. No. 2,371,786. Arthur Turner to Bausch & Lomb Optical Co.

Resilient material employed to form a pressure seal, comprising compact material having basis of wood-pulp cellulose fibers and having incorporated aqueous solution containing organic hygroscopic material selected from glycerine and diethylene glycol, and facing of preformed organic derivative of cellulose foil secured to said material. No. 2,371,710. George Schneider and Mervin Martin to Celanese Corp. of America.

Abrasive article comprising abrasive grains and bond therefor comprising a phenol resinoid modified by a metal selected from titanium, vanadium, chromium, manganese, iron, cobalt, and nickel. No. 2,371,700. Harry Martin and Frederick Upper to The Carborundum Co.

Investment composition for manufacture of resin base dentures and characterized by forming protecting film on removal of wax mold whereby penetration by resin is prevented, comprising a calcined gypsum, a lower trialkylolamine, a lower water soluble alkyl cellulose ether and a high melting point wax. No. 2,371,688. Jacob Gold.

Petroleum oil composition as a lubricant for ferrous and non-ferrous metal surfaces and capable of preventing rusting and corrosion comprising mineral lubricating oil containing partially dehydroxylated castor oil, a fatty monoester, tertiary alkyl phenol, and neutral addition product of 3-methyl-butyl, 2-ethyl-hexyl acid phosphate and di-cyclohexyl amine, dissolved therein. No. 2,371,656. Herschel Smith and Troy Cantrell to Gulf Oil Corp.

Petroleum oil composition as a lubricant for ferrous and non-ferrous metal surfaces and capable of preventing rusting and corrosion, comprising mineral lubricating oil containing partially dehydroxylated castor oil, a fatty monoester, tertiary alkyl phenol and neutral addition product of 3-methyl-butyl, 2-ethyl-hexyl acid phosphate and a primary fatty amine dissolved therein. No. 2,371,655. Herschel Smith and Troy Cantrell to Gulf Oil Corp.

Degreasing surfaces of aluminum and its alloys with chlorinated hydrocarbon solvents subject to deterioration in presence of aluminum, which comprises maintaining, in admixture with such chlorinated solvents, a carboxylic acid ester to inhibit such metal-induced decomposition. No. 2,371,647. Wilbur Petering and Adam Aitchison to Westvaco Chlorine Products Corp.

Degreasing surfaces of aluminum and its alloys with chlorinated hydrocarbon solvents subject to deterioration in presence of aluminum, which comprises maintaining, in admixture with such chlorinated solvents, an organic oxime to inhibit such metal-induced decomposition. No. 2,371,646. Wilbur Petering and Adam Aitchison to Westvaco Chlorine Products Corp.

Degreasing surfaces of aluminum and its alloys with chlorinated hydrocarbon solvents subject to deterioration in presence of aluminum, which comprises maintaining, in admixture with such chlorinated solvents, an organic ether to inhibit such metal induced decomposition. No. 2,371,645. Adam Aitchison and Wilbur Petering to Westvaco Chlorine Products Corp.

Degreasing surfaces of aluminum and its alloys having decomposing effect on chlorinated hydrocarbon solvents, which comprises contacting surfaces with solvent composition comprising chlorinated hydrocarbon grease solvent and oxygen-containing compound. No. 2,371,644. Wilbur Petering nad Adam Aitchison to Westvaco Chlorine Products Corp.

Lubricant comprising oil of lubricating viscosity and ester of an acid of phosphorus and a polyhydroxy organic compound which contains elements selected from halogens, sulfur, and nitrogen, said ester increasing resistance of lubricant to oxidation and to formation of corrosive products during use. No. 2,371,631. Bert Lincoln and Gordon Byrkit to Continental Oil Co.

Detergent selected from soap and higher fatty non-soap detergents being rendered resistant to development of rancidity by having incorporated non-detergent compound selected from aliphatic and aromatic compounds containing trivalent nitrogen and carboxyl groups. No. 2,371,623. Lloyd Henderson to Lever Brothers Co.

Coatings

Coating textile fabric to provide tightly adherent flexible coating on surface with no impregnation thereof, which comprises applying to textile fabric molten plastic composition consisting of ethyl cellulose, a plasticizer therefore and wax as film-forming components under heat and pressure. No. 2,373,278. Waldorf Traylor to Hercules Powder Co.

Producing articles having marbleized wrinkle finish comprising floating of a plurality of wrinkle drying coating films in form of striated layers over surface of body of water, immersing article to be coated, etc. No. 2,373,211. William Waldie to New Wrinkle, Inc.

Apparatus for testing a coating on test panel, an arm, a pressure member fixed to arm and in contact with panel, means for effecting relative movement between panel and pressure member, etc. No. 2,373,200. Glen Simmons and Howard Simmons to Western Electric Co. Inc.

Making wrinkle finish coating composition comprising mixing resin, wrinkling drying oil other than dehydrated castor oil and metallic drier together to form oleoresinous wrinkling varnish and blending therewith second wrinkling oleoresinous varnish containing mixture of wrinkling drying oils including dehydrated castor oil. No. 2,373,177. Folsom Drummond and William Waldie to New Wrinkle, Inc.

Temporary surface protection of plastic sheets characterized in having normally soft surface which comprises coating sheet with thin and uniform film of polyvinyl alcohol. No. 2,372,982. Alvin Richards, John Mickey and James O'Reilly to Ford Motor Co.

Coated sheet product comprising light-permeable film-like backing sheet, a light-impermeable two-layer coating on one surface of sheet, innermost of said layers comprising mixture of adhesive colloidal binder and a non-drying plasticizer, outer layer being superposed on innermost layer and comprising mixture of an adhesive colloidal binder and a non-drying plasticizer. No. 2,372,679. Harry Magid.

Clear hardware lacquer for coating copper-containing metal articles by processes such as dipping, which lacquer comprises a clear-film-forming base and an alkyl monoester of malic acid as a greening inhibitor. No. 2,372,643. Ernest Almy to Atlas Powder Co.

Lens coating material consisting of evaporation product of mixture of equal molecular parts of calcium fluoride and aluminum fluoride. No. 2,372,639. James Reynolds to Radio Corp. of America.

Producing coating material which comprises heating mixture including resin and an oil having drying properties and mixing urea with solution to form resultant product which is miscible with water and with mineral or gum spirits. No. 2,372,577. Eugen Hirsch.

Opalescent lacquer for interior use: a quick-setting low solids cellulose ester binder vehicle containing cellulose ester, aluminum bronze, and non-metallic pigment. No. 2,372,334. Dean Murphy to Chadeloid Chemical Co.

Silicate coated article and method of making same. No. 2,372,285. Henri Marc and Harold Greider to the Philip Carey Manufacturing Co.

Coating hydraulic cement product which comprises applying aqueous composition that contains soluble silicate consisting of potassium silicate, and drying and heat curing coating. No. 2,372,284. Henri Marc to The Philip Carey Manufacturing Co.

Apparatus for coating sheet material comprising a bath receptacle formed with a slot in its lower portion, etc. No. 2,372,248. Marvin Bouton to The Bouton Foster Co.

Air drying coating composition comprising hydrocarbons derived from waste products of mineral oil refining and having characteristics identical with those of products composed of 90 per cent carbon and 10 per cent hydrogen, which are obtained by neutralizing petroleum acid sludge. No. 2,371,652. Fritz Rostler and Leopold Bornstein to Wilmington Chemical Corp.

Coating adhesively coated backing material with elongated particles of abrasive with their longer axes in parallelism to the backing. No. 2,371,605. Richard Carlton and Theodore Miller to Minnesota Mining & Manufacturing Co.

Dyes, Stains

Liquid sulphur dye composition for printing, containing no reducing agents and comprising alkali solution of sulphur dye, and a mixture of aliphatic, straight chain, non-substituted, polyethylene amines. No. 2,373,261. Ewen Robinson and John Boesch, Jr. to Southern Dyestuff Corp.

Cyanine dyestuff intermediates. No. 2,372,960. John Kendall, Henry Wood and John Majer to Ilford Ltd.

Anthraquinone compounds and material colored therewith. No. 2,372,663. Joseph Dickey and James McNally to Eastman Kodak Co.

Equipment

Gas scrubber for removing emulsifiable constituents from a gas stream. No. 2,373,565. Oscar Hupp to General Electric Co.

Waste heat boiler. No. 2,373,564. Lyman Huff to Universal Oil Products Co.

Thermostatically-controlled electrically heated oven for heat treatment of a filamentary product such as enamelled wire. No. 2,373,550. James Dalgleish to Pye Ltd.

Blast furnace. No. 2,373,514. John Stewart.

Liquid filling apparatus for chemical laboratory. No. 2,373,435. John Torigian.

Oil purifying and cooling system. No. 2,373,349. John Serrell to The Sharples Corp.

Additional patents on equipment, explosives, fine chemicals, foods, industrial chemicals, inorganic, industrial chemicals, organic, metals and alloys, medicinals, photographic chemicals, resins and plastics, rubber, textiles, paints and pigments, paper and pulp, petroleum chemicals, petroleum refining, water sewage and sanitation from the above volumes will be given next month.

Abstracts of Foreign Patents

Collected from Original Sources and Edited

Those interested in obtaining further information concerning the patents reported below should communicate with the Patent Department, CHEMICAL INDUSTRIES. Photostated copies of Canadian patents are available from the Commissioner of Patents, Ottawa, Canada.

CANADIAN PATENTS

Granted and Published January 30, 1945

Improvement in process for cyanide extraction of metal ores involving artificially cooling reactions to maintain temperature between 32-50 Fahr. during extraction period. No. 425,243. Allan J. Clark, Nathaniel Herz, Earl Walter Adams.

Mineral oil lubricant having dispersed therein small amount of ferric oxide to inhibit gum formation. No. 425,255. Alfred Charles Glyn Egerton.

Method of manufacturing electric immersion heaters. No. 425,262. William Kleiman.

Explosive gun trap to destroy predatory animals. No. 425,275. Charles L. Wainwright.

Purification of aluminum containing antimony, bismuth, lead or tin, by adding sodium to the melt, and removing the dross so formed. No. 425,280. Aluminum Company of America (Philip Trimble Stroup)

Production of gasoline hydrocarbons. No. 2,370,507. Charles Teichmann and Arthur Goldsby, Gordon Kessler and Max Neuhaus to The Texas Co.

Method of solvent recovery in vapor phase extraction processes. No 2,370,530. William Gage to Shell Development Co.

Manufacturing naphthas having improved anti-knock rating and low unsaturation and suitable for aviation gasoline. No. 2,370,533. Harold Gershinowitz to Shell Development Co.

Mineral oil cracking process. No. 2,370,541. Joseph James to Clarence Byrnes, as trustee.

Separating lubricating fraction of petroleum into constituent parts which comprises diluting lubricating fraction with a light hydrocarbon solvent, bringing diluted oil to critical temperature and pressure of light hydrocarbon solvent, etc. No. 22,612. Warren Lewis to Standard Oil Development Co.

Catalytic treatment of hydrocarbons boiling in gasoline boiling range with sulf-active catalyst consisting of pellets of dehydrogenating metal sulfide, which comprises periodically restoring activity of catalyst by treatment with gas mixture comprising sulfur dioxide and hydrogen sulfide. No. 2,370,707. Raymond Archibald to Shell Development Co.

Catalytic treatment of hydrocarbons and revivification of catalyst in situ, comprising passing hydrocarbon vapors through a bed of solid adsorbent catalytic material, etc. No. 2,370,713. Lawrence Carlson to The Gray Processes Corp.

Two-stage alkylation process comprising absorption zones where mixed feed stock containing olefins and paraffins is contacted with sulfuric acid to form extract phase and raffinate phase and first alkylation zone wherein extract is reacted with isoparaffin under alkylating conditions. No. 2,370,771. Ernest Bowerman to Standard Oil Development Co.

Catalytic dehydrogenation of hydrocarbons selected from mono-olefins and aralkyls having at least two carbon atoms in alkyl group which comprises contacting with catalyst comprising zinc oxide and oxide selected from iron, manganese, cobalt, nickel, and chromium oxides and promoter comprising potassium oxide. No. 2,370,797. Kenneth Kearby to Standard Oil Development Co.

Catalytic dehydrogenation of hydrocarbons selected from mono-olefins and aralkyls, which comprises contacting with catalyst comprising beryllium and iron oxide, manganese oxide, chromium oxide, cobalt oxide, or nickel oxide, and promoter comprising potassium oxide. No. 2,370,798. Kenneth Kearby to Standard Oil Development Co.

Removing acetylenes from gaseous mixtures of saturated and unsaturated hydrocarbons, which comprises precipitating acetylenes by contacting with aqueous basic cuprous salt solution containing in suspension water insoluble metallic hydroxide. No. 2,370,809. Charles Morrell and Miller Swaney to Standard Oil Development Co.

Recovering tertiary olefins from hydrocarbon mixtures of similar boiling range. No. 2,370,810. Charles Morrell and Miller Swaney to Standard Oil Development Co.

Continuous process of refining petroleum oils containing mercaptans by doctor treating. No. 2,370,819. Irving Staid and Joseph Murphy to Standard Oil Development Co.

Production of acrylonitrile which comprises admixing low-boiling paraffin hydrocarbon with ammonia, etc. No. 2,370,849. Harris Dutcher to Phillips Petroleum Co.

Aqueous asphalt emulsion comprising asphalt as dispersed phase, water as continuous phase, and an emulsifying agent comprising alkali metal saponified B wood rosin oil and alkali metal saponified B wood rosin. No. 2,370,911. Evart Mayfield to Hercules Powder Co.

Manufacturing asphaltic products whose surface is protected by non-absorbent granules partially embedded therein, the step of concentrating highly oil-soluble asphalt oxidation inhibitor, selected from alkylated polyhydroxy benzene, copper naphthenate, and naphthylene diamine at the interfaces. No. 2,370,994. Thomas Reamer to Shell Development Co.

Producing stable motor fuel blend consisting of ethyl alcohol and gasoline from mixture of concentrated aqueous alcohol and gasoline. No. 2,371,010. Alfred Wolfner.

Increasing octane number of olefinic gasoline fraction resulting from thermal conversion of hydrocarbon oil. No. 2,371,079. Charles Thomas and Jacob Ahlberg to Universal Oil Products Co.

Making unsaturated aliphatic gaseous hydrocarbons pyrolytically, burning carbonaceous material with pure nitrogen-free oxygen, etc. No. 2,371,147. Robert Burk to The Standard Oil Co.

Obtaining alkyl toluenes from petroleum oil comprising toluene and saturated hydrocarbons wherein boiling points of toluene and hydrocarbons are so close together that they cannot be separated by conventional fractional distillation. No. 2,371,163. Alfred Francis and Carleton Schlesman to Socony-Vacuum Oil Co., Inc.

Granted and Published February 13, 1945 (Continued)

Preparation of partially esterified compounds of the dihydro-estrin series. No. 425,579. Society of Chemical Industry in Basle (Karl Miescher, Caesar Scholz)

Carboxylic acid formed by oxidation of R. CO. CH₃, where R stands for a cyclo-pentano-polyhydroxy-phenanthrene residue. No. 425,596. Winthrop Chemical Co. Inc. (Max Bockmuhl, Gustav Ehrhart, Heinrich Ruschig)

Cortical hormone efficacity substance and product. No. 425,597. Winthrop Chemical Co. Inc. (M. Bockmuhl, G. Erhart, W. Aumuller, H. Ruschig)

Manufacture of fabrics resembling animal pelts by treatment of cellulose pile fabrics with hot aqueous solution of pyridinium compound of octadecyloxy-methyl chloride, drying, and baking at 20 Cent. No. 425,601. Henry Dreyfus (Wm. I. Taylor, J. F. Kevers)

Wind and waterproof fabrics composed of cellulose derivatives with backing of polymer derivative of vinyl alcohol, acrylic acid, or methacrylic acid. No. 425,602. Henry Dreyfus (W. I. Taylor, J. F. Levers)

Match splint manufacturing machine. No. 425,607. Lorenz Contratto.

Granted and Published Feb. 20, 1945.

Withheld from publication July 21, 1942:

Tin plating aluminum articles by means of chemical deposition from a solution composed of 4 to 13 per cent of sodium stannate and 0.7 to 3 per cent sodium acetate in water. No. 406,252. Aluminum Company of America (Edward Vernon Blackmun, Michael Paul Mikula)

Withheld from publication Nov. 24, 1942:

Glycerol fermentation process, embodying the addition of ammonia and ammonium salt nutrients to yeast-mash, in excess of nutrient requirements of the yeast, to promote the formation of glycerol, with solution maintained at pH 6 to 7 by employment of non-toxic neutralizers. No. 408,881. U. S. Industrial Alcohol Co. (Howard Marvin Hodge)

Withheld from publication April 18, 1944:

Method and apparatus for manufacturing adhesively bonded structures, employing pre-assembly of adhesive elements, embedding assembled structure in a body of granular, readily flowable, solid material, applying pressure to the granular body while subjected to currents of heated air. No. 419,700. His Majesty the King, represented by Minister of Mines and Resources (John Frederick Harkom)

Method of manufacturing composite boards of the parquet veneer type. No. 425,627. Gustav Kahr.

Electric soldering iron design. No. 425,628. Ervin Mestitz.

Non-skid pneumatic tire construction and tread design. No. 425,631. The Firestone Tire & Rubber Co. (James Joseph Robson)

Process for the production of saturated hydrocarbons by the alkylation of isobutane or isopentane by condensation with one of lower olefines, wherein the acid used for washing or treating the alkylate is subsequently used in the condensation stage for the preparation of further alkylate. No. 425,644. Anglo-Iranian Oil Company Ltd. (Stanworth Wills Adey)

Catalytic conversion of mixture of octenes, disobutene, and triisobutene into isobutane by hydrogenation of the octenes and depolymerization and hydrogenation of higher polymers. No. 425,645. Anglo-Iranian Oil Co. Ltd. (Donald Albert Howes, Leslie C. Strang)

Production of vinyl monochloro-phenoxy acetate. No. 425,656. Canadian General Electric Co. Ltd. (G. F. D'Alelio)

Gas blast circuit interrupter. No. 425,661. Canadian Westinghouse Co. Ltd. (Herbert L. Rawlins)

Increasing hardness and conductivity of alloy consisting of 0.08 to 2.54 per cent Cr; and balance copper, by heat treating at 1000° Cent., quenching, and ageing at about 450° Cent. No. 425,664. Canadian Westinghouse Co. Ltd. (Franz R. Hensel, Earl I. Larsen)

Production of high tensile strength, laminated phenol-aldehyde body, resistant to delamination, by coating glass fibre cloth with oil modified phenol-formaldehyde, enveloping in straight phenol-formaldehyde, and consolidating by heat and pressure. No. 425,665. Canadian Westinghouse Co. Ltd. (Robert W. Auxier)

Solution of glass-forming components comprising liquid polyhydric alcohol solvent; and frit dissolved therein, composed of oxides of lead and boron, and at least one oxide of calcium, silicon, and alkali metals. No. 425,667. Canadian Westinghouse Co. Ltd. (Robert N. Wenzel)

Protective coating solution for zinc, its alloys, and non-ferrous metals, comprising aqueous solution of phosphoric acid, metal phosphate and oxidizing agent, and iron of minimum 0.10 per cent. No. 425,670. Canadian Westinghouse Co. Ltd. (Geo. W. Jernstedt, John C. Lum)

Corrosion-inhibiting solution for metal treating, composed of combination of a dialkali phosphate, ferric iron, and organic hydroxy acid reached to form a complex, the complex containing from 0.1 to 1.0 per cent of ferric iron based on dialkali phosphate content. No. 425,672. Canadian Westinghouse Co. Ltd. (Geo. W. Jernstedt, John C. Lum)

Plastic composition capable of forming flexible films at low temperatures essentially composed of a vinyl ester plasticized with a diester of a substituted hydrophthalic acid; e.g. di(2-ethylhexyl) methyl hexahydrophthalate. No. 425,678. Carbide and Carbon Chemicals Ltd. (Chas. E. Staff, Wm. N. Stoops)

Plug gauge, composed of metal core and metal sleeve, and intermediate uniting member of hard, non-metallic material. No. 425,685. Deloro Smelting and Refining Co. Ltd. (Maurice Riddihough)

Controlling pulp density in a wet grinding process by determining pulp density-noise level relationship, and maintaining uniformity of pulp by maintenance of optimum noise level, automatically. No. 425,693. Hardinge Company (Harlowe Hardinge)

Production of wrinkle-resistant cellulosic textiles by outlined formaldehyde treatment to form cellulose-formaldehyde compound therein. No. 425,694. Heberlein Patent Corporation (Samuel Frauenfelder)

Process of carroting fur on the pelt by acid-hydrogen peroxide treatment. No. 425,713. No-Mercury Felt Corporation (Jack Dmitry Sartakoff)

Method and apparatus for making sponge iron from iron oxide. No. 425,717. Plastic Metals Inc. (John Leslie Young)

Electric resistance thermometer design, with element thereof composed of two series-connected wires, of the same metal, but having different first order temperature coefficients of resistance. No. 425,722. Simmonds Development Corporation Ltd. (Alex. Constantine Denisoff, Bernard Patrick Scanlan)

Reduction of acrylonitrile to propionitrile by hydrogenating, under 120 atmosphere pressure in presence Raney nickel catalyst. No. 425,743. Wingfoot Corp. (Charles F. Winans)

Degradation of carboxylic acid of general formula RCOOH, wherein R represents an unsaturated cyclopentano-polyhydrophenanthrene having in 3-position an acyl-oxy radical, to the corresponding isocyanate. and hydrolyzing to the amine. No. 425,744. Winthrop Chemical Co. Inc. (Max Bockmuhl, Gustav Erhart, Heinrich Ruschig)

Thermostatic switch design. No. 425,753. Joseph Wilfrid Tousignant.

Plastic composite resistant to bullet-impact shattering, composed of layer of 100 parts cellulose acetate, 70-85 parts plasticizer; embedded wire fabric; and laminated to cellulose acetate containing 25-45 parts dimethoxy ethyl phthalate. No. 425,755. Camille Dreyfus (Bjorn Anderson, Ernest Schweizer)

Suppository consisting of "Insulin," cocoa-butter, palmitic acid, lactic acid, and non-hemolytic saponin. No. 425,759. N. V. Thelopharm (Benno Benjamin, Adolf Brahn)

Method of improving magnetic properties of dispersion-hardenable alloy by heat treatment. No. 425,760. Jacob Louis Snock.

Granted and Published Feb. 27, 1945.

Fire extinguisher comprising cellular units, with cell units having low fusing wall portions and containing reagents to generate fire-smothering gas upon contact with each other. No. 425,767. Joseph Coates Carter.

Fountain brush design. No. 425,771. James Robert McDonald.

Insecticidal composition containing as essential ingredient triphenylmethyl methyl ether; 1-naphthylmethyl tetradecyl ether; or, 1-naphthylmethyl butyl ether. No. 425,791. American Cyanamid Co. (Ingenuin Hechenbleiknер)

Combined penetrating and lubricating composition for rubber, comprising solution of 30 per cent castor oil; 15 per cent methanol; 10 per cent commercial hexanes; 45 per cent isobutanol; and 19 gms. hydroquinone per gallon. No. 425,809. Canadian Industries Ltd. Kenneth Elwin Walker)

Catalytic process for preparation of saturated polycarboxylic acid from non-drying and semi-drying hydroxylated fatty acids and unsaturated fatty acids of more than 8 carbon atoms, and their esters. No. 425,810. Canadian Industries Ltd. (Donald J. Loder, Paul L. Salzberg)

Method of oxidizing normally gaseous saturated hydrocarbons—butane, pentane, propane, etc.—by oxidation in liquid phase by means of gaseous oxygen in presence of catalyst, oxidation initiator such as peroxide, and solvent for the hydrocarbon. No. 425,811. Canadian Industries Ltd. (Donald John Loder)

Improved apparatus for the manufacture of tubing of cast synthetic resin. No. 425,812. Canadian Industries Ltd. (Reuben Thomas Fields)

Synthetic linear polyamide composition containing an ester of a polycarboxylic acid and a monohydric ether alcohol, e.g., diethoxyethyl phthalate. No. 425,813. Canadian Industries Ltd. (Gordon Theodore Vaala)

Catalytic process for oxidation of normally liquid aliphatic compounds of class consisting of allyl acetate, allyl chloride, ethyl crotonate, by means of free oxygen, catalyst, peroxide or peroxide-forming oxidation initiator, and organic solvent for the compound, between 75 to 250 Cent. No. 425,814. Canadian Industries Ltd. (Donald John Loder, Ambrose McAlevy)

Polymerization of substance containing unsaturated methylene compound, by placing monomer in silver-lined mold, and heating to polymerize in the mold. No. 425,815. Canadian Industries Ltd., assignee of E. I. duPont de Nemours & Co., assignee of Norton Co. (Samuel S. Kistler)

Improvement of physical characteristics of polymeric ethylene compositions by intimate admixture polyvinyl isobutyl ether therein in ratio of 20 to 50 parts of ether per 100 parts of polymerized ethylene. No. 425,816. Canadian Industries Ltd. (Cyril Leonard Child, Bernard James Habgood)

High temperature refractory brick comprising alumina bubbles containing 1 to 1½ per cent titania. No. 425,817. The Carborundum Company (John Charles McMullen)

Detergent product in form or bar or cake, containing an essential ingredient, a neutralized reaction product formed from fatty oil, anhydrous glycerine, and fuming sulfuric. No. 425,822. Colgate-Palmolive-Peet Co. (Fred W. Muncie)

Fusible, solid, opaque, styrene polymer, substantially insoluble in benzene, prepared by polymerization of styrene below 110° Cent. in presence of neutral organic ester of allyl, 2-chloro-allyl, or methyallyl alcohol. No. 425,828. The Dow Chemical Co. (Edgar C. Britton, Walter J. Le Fevre, Harry B. Marshall)

Resilient springing means for vehicles, for cushioning angular movements about a connection. No. 425,829. Dunlop Tire and Rubber Goods Co. Ltd. (James Claude Hickman)

Gluing assembly method wherein units are assembled with conduits adjacent to the glue lines, clamping, and passing warm air through conduits to accelerate setting of adhesive. No. 424,847. I. F. Laucks Ltd. (Henry H. Payzant)

Pickling solution for removing scale from stainless steels, containing in aqueous solution, by volume, 3 to 30 per cent of sulfuric or phosphoric acid, 4 to 30 per cent nitric, 1 to 2 per cent hydrofluoric. No. 425,863. Solar Aircraft Co. (Franklin Homer Page Jr.)

Pulp filter design. No. 425,868. Swenson Evaporator Company (Carl Bernhard Nyman)

Solder consisting, by weight, of: 1.0 per cent cadmium; 0.5 per cent antimony; 0.25 per cent copper; and a balance of equal parts of lead and tin. No. 425,881. Western Electric Company, assignee of Bell Telephone Laboratories Inc. (Geo. Musson, Geo. S. Phipps, E. E. Schumacher)

Apparatus for preventing the lapping of yarn on nip or feed rolls. No. 425,890. Camille Dreyfus (Wm. J. Elvin, Frank W. Schulte)

Granted and Published March 6, 1945

Method of making an adsorbent by reacting, in presence of water available lime and phosphate in contact with clay and carbonizable organic matter, to precipitate insoluble basic phosphate, more alkaline than hydroxyapatite, granulating, and carbonizing. No. 425,897. Elliott P. Barrett, James R. West.

Fibrous glass composed essentially of: SiO_2, 63%; CaO, 14%; MgO, 3%; B_2O_3, 5%; Na_2O and K_2O, 10%, Al_2O_3 or Fe_2O_3, 5%. No. 425,988. Urban E. Bowes.

Apparatus for the vacuum desiccation of solutions, incorporating refrigerating medium therein. No. 425,916. Arthur Sproule McFarlane.

High vacuum, low temperature drying apparatus design. No. 425,920. Wyeth Incorporated. (John Reichel)

High speed metal cutting saw composed of high speed steel, toothed section having Rockwell not less than C 61, and hardness of tooth backing about C 45 Rockwell. No. 425,921. Lerned F. Ronan.

Method of manufacture of textile-backed, plastic tiling, by extrusion. No. 425,923. Charles E. Slaughter.

Composite reagent suitable for use in production of chromium alloys consisting of anhydrous, intimate mixture of, calcium chromite, calcium chromate, and non-carbonaceous reducing agent. No. 425,926. Marvin J. Udy.

Pest control composition containing toxic amount of 1,6-dithiocyanohexane, or 1, 12-dithiocyanooctadecane. No. 425,928. American Cyanamid Company (Richard O. Roblin, Jr., Ingenuin Hechenbleiknер)

Fibre-forming polyamide and phenol-formaldehyde resin composition, as a new composition of matter, wherein the polyamide is polyhexamethylene adipamide. No. 425,942. Canadian Industries Ltd. (Gordon Theodore Vaala)

Apparatus for the controlled application of coating solution to web material. No. 425,943. Canadian Kodak Co. Ltd. (Harold L. Austin, Lee W. Leonhard)

Liquid fuel burner, so designed as to minimize deposits from hydrocarbon fuel combustion. No. 425,950. The Coleman Lamp and Stove Co. Ltd. (Boyd W. Tullis)

Method of manufacture of carbon electrodes. No. 425,956. The Dow Chemical Co. (Edward R. Cole)

Member for use in bi-metallic thermoregulator element, having high coefficient of thermal expansion, composed of tough, ductile, manganese-base alloy, containing: Mn, 87%; Cu, 5%; Ni, 8%. No. 425,958. Electro Metallurgical Co. of Canada Ltd. (William Kroll)

Improved method of manufacturing chromium steel, which comprises addition of high-chromium alloy, of stated composition, to base steel. No. 425,959. Electro Metallurgical Co. of Canada Ltd. (Ernest F. Doom)

Improved degumming operation in silk processing, comprising removal of sericin from silk fibroin by agitation in hot (220-212F) aqueous acid solution, buffered to maintain pH at 1 to 2.9. No. 425,968. The Institute of Paper Chemistry (Ben W. Rowland, Douglas Fronmuller)

Laminated safety glass, with plastic centre extending beyond glass edges to form water-tight seal. No. 425,978. Lockheed Aircraft Corporation (Thomas M. McClain)

Rust-proof coating metals by phosphate solution treatment and passing sheet metal through rollers to accelerate the coating action. No. 425,987. Parker Rust-Proof Company (Robert R. Tanner)

Plastic material extruding and blowing machine design. No. 425,988. Plaz Corp. (William Henry Kopitke)

Production of monomethylol butanone by reacting dimethylol butanone with methyl ethyl ketone in presence of barium hydroxide. No. 425,995. Shell Development Company (Hendrik Wilhelm Huyser)

Process for removing, separating, and purifying homologous carbonyl compounds obtained by degradation of sterols, bile acids, and derivatives, by selective absorption procedure. No. 425,998. Society of Chemical Industry in Basle (Karl Miescher, Albert Wettstein, Ludwig Ehmann, Caesar Scholz)

Manufacture of new derivatives of compounds of the suprarenal cortical hormone series, by treating with etherifying sugar derivative in presence of etherification catalyst. No. 425,999. Society of Chemical Industry in Basle (Karl Miescher, Werner Fischer)

Manufacture of 3-derivatives of the saturated and unsaturated androstane-3-one-17-ols, substituted in 17 positions. No. 426,000. Society of Chemical Industry in Basle (Karl Miescher)

Inhibited motor oil containing 0.4 per cent of an alyklated phenol thioether, and 0.2 per cent triphenyl bismuth. No. 426,003. Standard Oil Development Co. (Raphael Rosen)

Heavy load lubricant, containing dispersion of sulphide of phosphorous in mineral oil. No. 426,012. Standard Oil Development Co. (John C. Zimmer)

Increasing tensile strength of deposited latex, vulcanized, article by half hour immersion in ethyl alcohol-acetic acid, and drying. No. 426,021. United States Rubber Co. (Robert Oliff Alexander)

Electric light source composed of envelope, electrodes, and silicon carbide capable of radiating light under direct influence of current. No. 426,034. Zolfon Bay (Gyorgy Azigeti)

Granted and Published March 13, 1945

Sanitary thermometer design. No. 426,037. LeRoy V. Edwards, Robert E. Tarring, Albert A. Weiss, Jr.

Lock nut design. No. 426,038. Frederick Wm. Berry.

Electronic micrometer suitable for determining thickness gauge. No. 426,039. Robert W. Carson.

Cellulose acetate thread base, water-proofed, window screen. No. 426,042. Camille Dreyfus.

Window screen of open mesh cellulose acetate fabric bound with 15 to 20 per cent ethyl cellulose. No. 426,043. Camille Dreyfus.

Apparatus for rolling rods of sheet material, such as bonded veneer. No. 426,046. Eric Mauritz Frid.

(*To be continued*)

Trademarks of the Month

A Checklist of Chemical and Chemical Specialties Trademarks

413,077; 413,078. The Smith-Alsop Paint and Varnish Co., Terre Haute, Ind.; filed Jan. 6, 1945; Serial No. 478,360; for rust inhibitive paint; 478,361; for semi-gloss finish paint; since Mar. 19, 1928; since Jan. 31, 1934.

413,196. The Pennsylvania Salt Mfg. Co., Philadelphia, Pa.; filed Sept. 25, 1943; Serial No. 463,654; for laundry sours; since May 28, 1943.

413,210. Pierre Campbell, N. Y.; filed June 26, 1944; Serial No. 471,656; for waterproofing fabrics; since 1940.

413,219. Wyandotte Chemicals Corp., Wyandotte, Mich.; filed Oct. 23, 1944; Serial No. 475,643; for alkaline composition containing organic surface tension depressant; since Jan. 29, 1941.

440,385. Meyer Rubenstein as the Bestoseal Co., N. Y.; filed Feb. 6, 1941; for ready-mixed paints; since December 1927.

463,059. Aridye Corp., Fair Lawn, N. J.; assignor to Interchemical Corp., N. Y., a corporation of Ohio; filed Aug. 28, 1943; for household fungicide; since July 9, 1943.

465,093. United States Quarry Tile Co., Canton and East Sparta, Ohio, and Parkersburg, W. Va.; filed Nov. 17, 1943; for crucibles and mortars; since Dec. 22, 1942.

466,642. Dagmar Chemical Co., Stamford, Conn.; filed Jan. 17, 1944; for paints; since March 1934.

466,653. McCoy, Jones & Co., Inc., Chicago, Ill.; filed Jan. 17, 1944; for resinous sheets; since Dec. 30, 1943.

467,782. W. C. Hardesty Co. Inc., N. Y.; filed Feb. 26, 1944; for fatty acid used in greases; since Mar. 25, 1943.

468,026; 468,027. W. C. Hardesty Co. Inc., N. Y.; filed Mar. 7, 1944; for animal and vegetable fat derivatives containing oleic, stearic, palmitic, and lauric acids; since Jan. 12, 1944; for animal and vegetable fat derivatives; since Aug. 27, 1934.

470,286. Alco Oil & Chemical Corp., Philadelphia, Pa.; filed May 16, 1944; for urea formaldehyde textile size; since Oct. 9, 1942.

470,559. The Chemical Corp., Springfield, Mass.; filed May 24, 1944; for soda ash; since May 1, 1944.

472,587. Penguin Products Ltd., Vancouver, Canada; filed July 24, 1944; for waterproofing cotton, wool; since May 15, 1944.

471,626. Reichhold Chemicals, Inc., Detroit, Mich.; filed June 24, 1944; for resins; since May 1944.

472,652. L. Sonneborn Sons, Inc., N. Y.; filed July 26, 1944; for soluble oils for textiles; since Mar. 15, 1920.

472,751. Reichhold Chemicals, Inc., Detroit, Mich.; filed July 29, 1944; for resins; since May 1944.

473,578. Reichhold Chemicals, Inc., Detroit, Mich.; filed Aug. 24, 1944; for oils; since June 30, 1943.

474,501. Oronite Chemical Co., Wilmington, Del. and San Francisco, Calif.; filed Sept. 22, 1944; for cresylic acids; since Apr. 15, 1944.

474,560. Vita-Var Corp., Newark, N. J.; filed Sept. 23, 1944; for linoleates and insecticides; since Aug. 10, 1944.

475,453. Phelan-Faust Paint Mfg. Co., St. Louis, Mo.; filed Oct. 18, 1944; for waterproof paints; since Mar. 15, 1938.

475,455. Phelan-Faust Paint Mfg. Co., St. Louis, Mo.; filed Oct. 18, 1944; for industrial baking finishes; since Mar. 26, 1937.

475,644. Arkansas Paint & Varnish Manufacturers, El Dorado, Ark.; filed Oct. 24, 1944; for paints; since Sept. 9, 1944.

476,108. Minuskin Sales Corp., N. Y.; filed Nov. 4, 1944; to prevent rusting; since Apr. 1, 1943.

476,315; 476,316; 476,317. Jacques Wolf & Co., Clifton, N. J.; filed Nov. 9, 1944; for sulphonated ester; since May 5, 1942; for sulphonated amide; since Apr. 19, 1934. For sodium alkyl aryl sulfonate; since Sept. 24, 1943.

476,340. Plasticides, Inc., Boston, Mass.; filed Nov. 10, 1944; for preventing fungus growths in plastics; since Oct. 16, 1944.

476,576. The Pennsylvania Salt Mfg. Co., Philadelphia, Pa.; filed Nov. 17, 1944; for insecticides; since June 25, 1943.

476,600. Onufry Danysh, as Danko Chemical Co., N. Y.; filed Nov. 18, 1944; for bleaching, deodorizing, detergent; since Aug. 25, 1944.

476,684. G. J. Liebich Co., Chicago, Ill.; filed Nov. 20, 1944; for paint enamel; since May 1, 1927.

476,908. Graver Tank & Mfg. Co. Inc., East Chicago, Ind.; filed Nov. 27, 1944; for zeolite materials; since Oct. 25, 1944.

476,963. Isidor H. Gilbert, as Progressive Lab. Specialties Co., Kew Gardens and Jamaica, N. Y.; filed Nov. 28, 1944; for laboratory apparatus; since Nov. 15, 1944.

477,300. Hemisphere Trading Co. Inc., New Orleans, La.; filed Dec. 7, 1944; for paints; since Oct. 9, 1944.

477,325. Cooper Metallurgical Lab., Cleveland, Ohio; filed Dec. 8, 1944; for liquid boron trichloride; since January 1944.

477,519. Lewis National Corp., Boston, Mass;. filed Dec. 13, 1944; for wetting agent for laundering; since April 1939.

477,643. Walter T. Deegan, Chicago, Ill.; filed Dec. 16, 1944; for corrosion inhibitor preparation; since Nov. 10, 1942.

477,657. Mann Fine Chemicals Inc., N. Y.; filed Dec. 16, 1944; for synthetic similar to menthol; since December 1939.

477,709; 477,710; 477,711. Monsanto Chemical Co., St. Louis, Mo.; filed Dec. 18, 1944; for resins for treating textiles; since June 2, 1944; since July 24, 1944; since June 21, 1944.

477,786. Mitchell-Bradford Chemical Co., Stratford, Conn.; filed Dec. 20, 1944; for silicate coatings; since June 28, 1942.

477,791. Sidney Rosen, Baltimore, Md.; filed Dec. 20, 1944; measuring device for use with pipettes; since Nov. 15, 1944.

477,880. General Aniline & Film Corp., N. Y.; filed Dec. 23, 1944; for photographic chemicals; since November 1944.

477,967. Carbola Chemical Co. Inc., N. Y.; filed Dec. 27, 1944; for disinfecting paint; since Dec. 15, 1914.

478,081. Oronite Chemical Co., Wilmington, Del. and San Francisco, Calif.; filed Dec. 30, 1944; for periodical; since Jan. 3, 1944.

478,131. Irl Marshall, as Home Service Co., Deerfield, Ill.; filed Jan. 1, 1945; for insect repellant; since Nov. 29, 1944.

478,850. A. Bromm & Co., Evansville, Ind.; filed Jan. 22, 1945; for insecticide; since June 7, 1944.

479,668. The Firestone Tire & Rubber Co., Akron, Ohio; filed Feb. 10, 1945; for rubber adhesive compositions; since Aug. 8, 1944.

Trademarks reproduced and described include those appearing in Official Gazette of U. S. Patent Office, Mar. 20 to Apr. 10, 1945.

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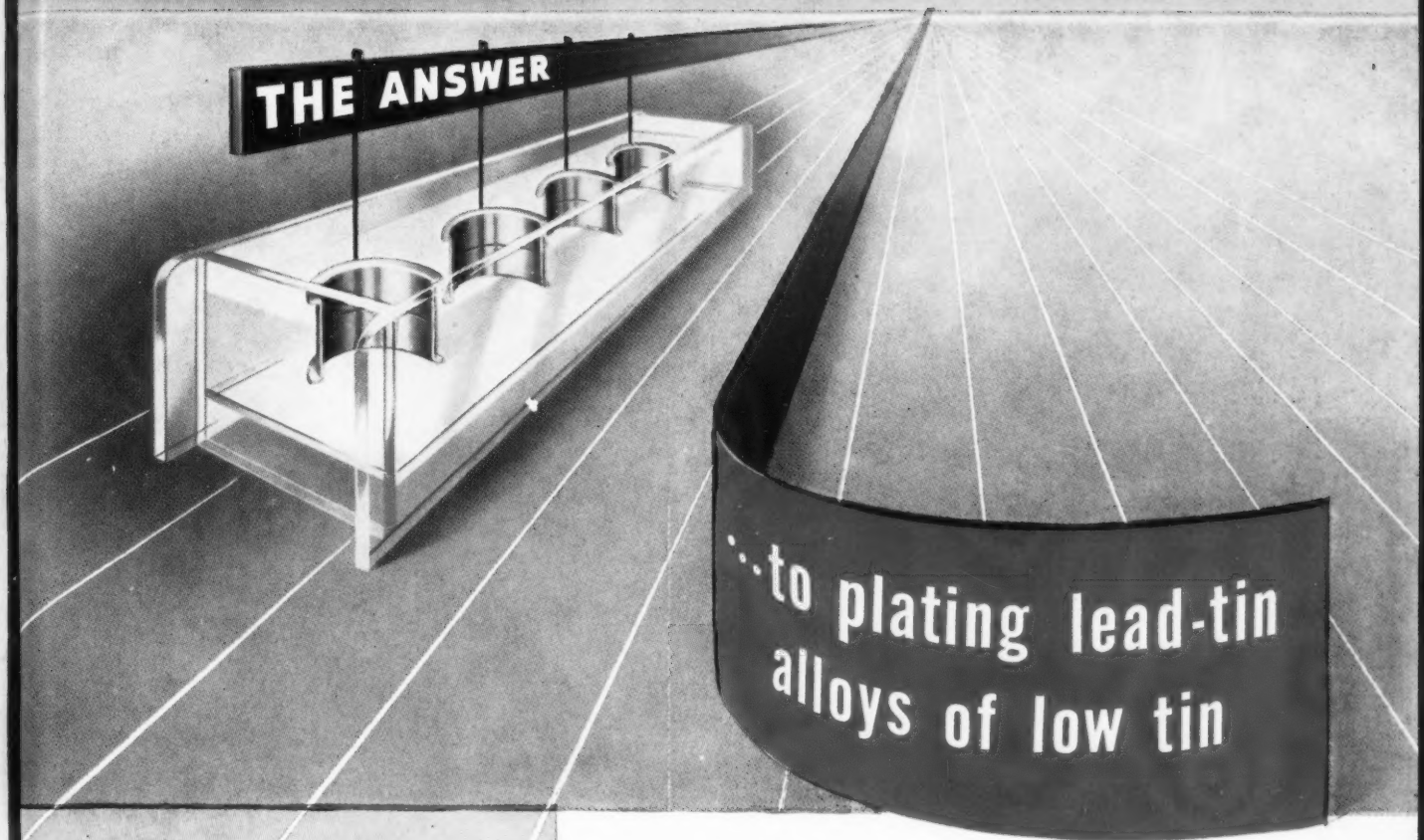

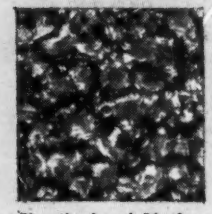

Fig. A: Lead Plating (100% Lead—0% Tin) *150 Diameters*

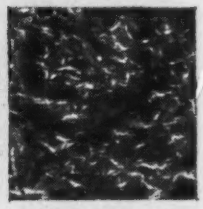

Fig. B: Lead-Tin Alloy Plating (91% Lead—9% Tin) *150 Diameters*

When tin is plated out simultaneously with lead from General Chemical Lead and Tin Fluoborate solutions, the lead-tin alloy plate obtained consists of a smooth, even cover in contrast to the grainy surface of the lead plate alone.

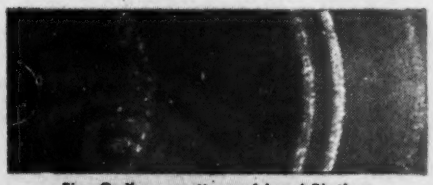

Fig. C: X-ray pattern of Lead Plating

Fig. D: X-ray pattern of Lead-Tin Alloy Plating (91% Lead—9% Tin)

Coarse grain spots in Fig. C coalesce in Fig. D to form more uniform lines, indicating finer grain structure. Only lead lines appear in both patterns since the tin atoms have entered the lead lattice to form an alloy in Fig. D.

For more than 25 years metal finishers have sought a successful means of plating lead-tin alloys in the low tin ranges. "Not feasible . . . inoperable . . . too many variables," read published reports on method after method.

Now—with the new chemical tools of General Chemical Fluorine Research—platers are achieving the "impossible."

Here's how: General Chemical *Lead* and *Tin Fluoborate solutions* are thoroughly compatible. Combined in baths using dual or alloy anodes, they plate out dense, fine-grained lead-tin alloy deposits . . . uniformly . . . simultaneously . . . and *with the tin easily controlled at low ranges!*

Thus, *in one operation* an alloy coating is produced that is harder, more wear-resistant, and has a more attractive appearance than lead plate alone. Little wonder that leaders in the bearing industry are adopting the combination fluoborate bath for lead-tin alloy plating of their products.

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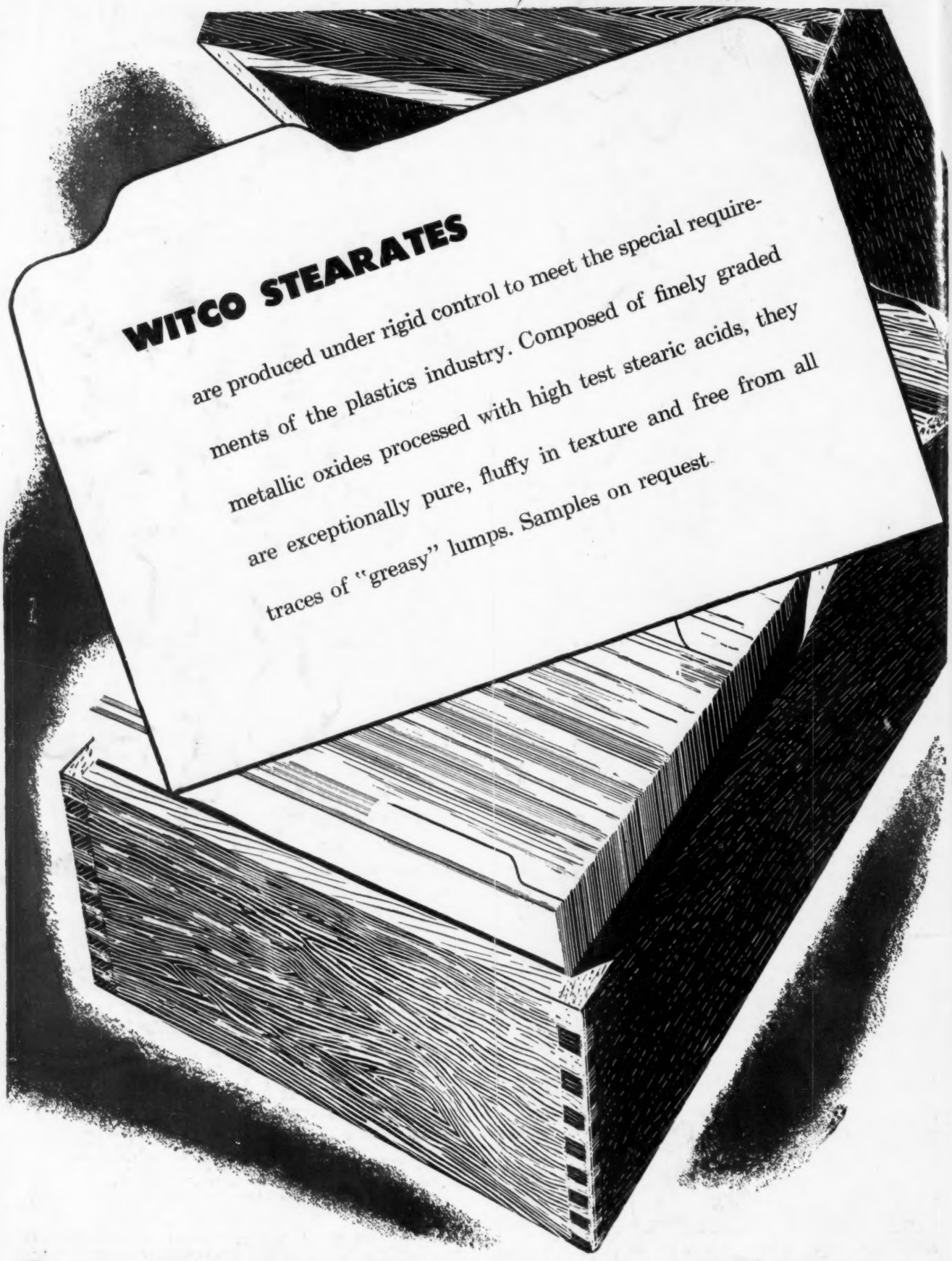
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